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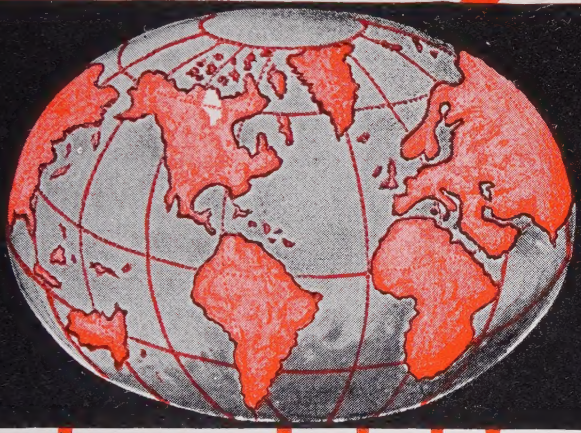

abstracts and bibliography

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Bibliography on Tropical Cyclones, Hurricanes and Typhoons, p. 1115

. 7 September 1956 No. 9

METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

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METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

MALCOLM RIGBY, Editor

Vol. 7 SEPTEMBER, 1956 No. 9

AGRICULTURE · COMMERCE · AERIAL AND MARINE NAVIGATION · PUBLIC HEALTH · INDUSTRY · ENGINEERING
AMERICAN METEOROLOGICAL SOCIETY
1919

SPECIAL FEATURE IN THIS ISSUE

An Annotated Bibliography on Tropical Cyclones Hurricanes and Typhoons

by
Wilhelm Nupen and Malcolm Rigby

Prepared for
U. S. Weather Bureau

(*For complete table of contents see back cover*)

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FOREWORD

Meteorological Abstracts and Bibliography is a monthly publication whose purpose is to ring to the attention of meteorologists current literature in their field and in related fields and o provide bibliographic information on various subjects, as interest demands.

Part I contains abstracts of current literature in the fields of meteorology, oceanography, c., arranged according to the Universal Decimal Classification.

Part II of each issue comprises a special annotated bibliography of important references n a special subject. No attempt is made to prepare exhaustive bibliographies; instead, the im is to include a representative cross section of the various aspects of a subject.

Bibliographies published in the successive issues were:

Vol. I, 1950

. Atmos. Pollution	2. Aerobiology	3. Cloud Physics	4. Hail
. Tornadoes	6. Volcanic Dust	7. Climat. Changes	8. Thunderstorms
. Icing	10. Acoust. Propagation	11. Evaporation	

Vol. II, 1951

. Extended Forecast.	2. Long Range Forecast.	3. Soil Temp.	4. Constants, etc.
. Clim. of Near East	6. Clim. of Middle East	7. Special Winds	8. Radar Storm Detect.
. Condensation Trails	10. Clim. of N.E. Africa	11. Mountain Met.	

Vol. III, 1952

. Clim. of N.W. Africa	2. Carbon Dioxide	3. Clim. of Argentina, etc.	4. Dew
. Objective Forecast.	6. Stratus Forecast.	7. Urban Climatology	8. Clim. of C. Africa
. Visibility	10. Glaze and Rime	11. Free Air Turbulence	

Vol. IV, 1953

. Turbulence Theory	2. Turbulent Diffusion	3. Frost	4. Clim. of Australia, etc.
. High Level Winds	6. Winds in Stratosphere	7. Jet Stream	8. Radiation Bioclim.
. Clim. of Pacific	10. Auroras	11. Sferics	

Vol. V, 1954

. Oceanog. Met.	2. Clim. of S.E. Asia	3. Auroral Physics	4. Tropopause
. Balloons	6. Numerical Forecast.	7. Radiation Data	8. Vertical Motion
. Clim. of Arctic	10. Industrial Met.	11. Wind Waves and Swell	

Vol. VI, 1955

1. Bibliog. of Bibliog.	2. Texts & Monogr. Bibliogs.	3. Storm Surges
4. Ionospheric Prop.	5. Photochem.—Upper Atmos.	6. Cloud Physics
7. Radar Cloud Physics	8. Atmos. Nuclei (1841–1950)	9. Atmos. Nuclei (1951–1955)
0. Weather Modification	11. Cooling Power	

Vol. VII, 1956

1. Synoptic Meteorology of the Arctic
2. Climate of Enclosed Spaces
3. Cosmic Rays in the Atmos. (–1952)
4. Cosmic Rays in the Atmos. (1953–1956)
5. Atmospheric Radioactivity
6. Tropospheric Inversions
7. Snow Micrometeorology
8. Snow Micrometeorology (Supplement)
9. Tropical Cyclones, Hurricanes and Typhoons

Forthcoming bibliography will be:

0. Hurricane and Storm Surge Damage, Vol. 7, No. 10, Oct. 1956.

Other bibliographies in preparation are:

Actinometers
Fog Forecasting
Forest Micrometeorology
Hurricane Theory
Microwave Propagation
Night Airglow
Ozone
Singularities
Solar-Weather Relations
Synoptic Aerology

Part III contains a listing of reviews, and the contents of those journals which are primarily meteorological. These are published in the earliest issue where space permits.

Part IV is made up of author, subject and geographical indexes. The December issue comprises cumulative author, subject, geographical and journal indexes.

EXPLANATIONS

Location of material: For each entry, a symbol is given for at least one library where th material may be found. The Union List of Serials (Gregory) is the source of most of th symbols used. In some cases, where no symbol has been assigned to a library, one will h devised according to the principles of the Union List.

Library symbols used frequently may be found in the following list:

DA:	U. S. Dept. of Agriculture Library. Washington, D. C.
DBS:	U. S. Bureau of Standards Library, Washington, D. C.
DGS:	U. S. Geological Survey Library, Washington, D. C.
DLC:	Library of Congress, Washington, D. C.
DN-HO:	U. S. Navy Hydrographic Office Library, Suitland, Md.
DSG:	U. S. Army Medical Library, Washington, D. C.
DSI:	Smithsonian Institution Library, Washington, D. C.
DWB:	U. S. Weather Bureau Library, Washington, D. C.
GB-MO:	Great Britain, Meteorological Office Library, Harrow, England.
MH-BH:	Harvard University, Blue Hill Observatory Library, Milton Mass.

Other symbols:

*	before an entry indicates a good data source.
†	before an entry indicates a good bibliography.
§	before an entry indicates a synoptic case history study accompanied by charts

Geographic locations are in the English form rather than the form used locally, for example Moscow for Moskva.

Titles of articles or monographs are in the language of the original article unless otherwis stated. Slavic (Cyrillic) titles are transliterated into the Roman alphabet according to th Library of Congress transliteration scheme.

Abbreviations:

Titles of periodicals are not abbreviated, as a rule.

The months of the year from March to July are not abbreviated. Other months ar abbreviated as Jan., Feb., Aug., Sept., Oct., Nov., and Dec.

The word or abbreviation for Volume (Tom, Band, Jahrgang, Año, etc.), for Numbe (Heft, Fascicule, Vypusk, etc.) and for page or pages is omitted from most entries. Thus a entry will read as follows:

Meteorologische Rundschau, 2(5/6):146–151, May/June 1950.

This indicates that the article appeared in *Meteorologische Rundschau, Jahrgang* 2 (Vol 2), *Heft* 5/6 (No. 5/6), *pages* 146–151, May/June 1950.

PART I. ABSTRACTS OF CURRENT METEOROLOGICAL MATERIAL

MAJOR GENERAL WORKS

COLLECTED WORKS

7.9–1 551.586:551.585.53:581.5

†United Nations Educational, Scientific and Cultural Organization, **Plant ecology: reviews of research.** Its *Arid Zone Research*, No. 6, **1955.** 377 p. figs. (incl. photos), tables. Comprehensive bibliography at end of each section. 5 maps (fold., in color, in pocket). **DLC**—The reports in this volume are reviews of the literature and research on the plant ecology of arid and semi-arid regions. Special attention is given to wild species of plants that grow in arid regions and that might be suitable as agricultural crops. As is to be expected, all the contributions are concerned in one way or another with various aspects of the relationships between plants and climate. The individual contributions are: **Afghanistan, India and Pakistan** by F. R. Bharucha; **Iran, Israel and Turkey** by H. Boyko; **Latin America** by A. L. Cabrera; **Australia** by J. Griffiths Davies; **Iraq, Jordan, Saudi-Arabia, Syria and Yemen** (in French) by P. Delbes; **Angola, South-West Africa, Bechuanaland and the Union of South Africa** by R. A. Dyer; **North-Western Africa** (in French) by L. Emberger; the **United States and Canada** by W. S. McGinnies; **Tropical East Africa (Ethiopea, Somaliland, Kenya, Tanganyika)** by R. E. Pichi-Sermulli. The appended maps include soil, vegetation and pasture maps of Australia and a geobotanical map of Iran, Israel and Turkey. *Subject Headings:* **1. Plant ecology 2. Desert bioclimatology 3. Arid zone research.**—*I.L.D.*

7.9–2 551.501:551.579.5

U. S. Forest Service. Southern Forest Experiment Station, **Some field, laboratory, and office procedures for soil-moisture measurement.** Its *Occasional Paper*, No. 135, July **1954.** 47 p. tables, refs. **DWB**—Contents: Broadfoot, W. M.: **Procedures and equipment for determining soil bulk density,** p. 2–11. Reinhart, K. G.: **Relation of soil bulk density to moisture content as it affects soil-moisture records,** p. 12–21. Broadfoot, W. M.: **Core vs. bulk samples in soil-moisture tension analysis,** p. 22–25. Ferguson, Edwin R. and Duke, William B.: **Devices to facilitate King-tube soil-moisture sampling,** p. 26–29. Doss, B. D. and Broadfoot, W. M.: **Terminal panel for electrical soil-moisture instruments,** p. 30–31. Woods, Frank and Hopkins, Walt: **Phone-jack terminals for soil-moisture units,** p. 32–33. Carlson, Charles A.: **Comparison of laboratory and field calibration of fiberglas moisture units,** p. 34–42. Carlson, Charles A.: **A core method for determining the amount and extent of small roots,** p. 43–47. *Subject Headings:* **Soil moisture measurement 2. Soil moisture instruments.**

TEXTBOOKS

See also: **Humidity** (Penman), 7.9–7.

7.9–3 551.5:63(02)

Kostin, S. I., **Osnovy meteorologii i klimatologii.** [Fundamentals of meteorology and climatology.] 3rd ed. rev. and enlarged. Leningrad, Gidrometeoizdat., **1955.** 393 p. 152 figs. (1 fold.), 11 tables, 24 refs. **DLC**—The 3rd edition of this text for students of agricultural meteorology has been somewhat revised, amplified and rearranged and includes about 20 more pages, a few more figures and tables and recent references. It consists of two main sections—one on processes of the weather and one on climatology and local climates of the Soviet Union. The role of solar radiation, soil temperature, evaporation, cloud physics and precipitation processes, frozen soil, influence of vegetation, shelter belts, snow cover, etc., and climatic zones, climatic conditions in various parts of the earth as well as the U.S.S.R. and climatic extremes are taken up systematically. (For abstract on 2d ed., pub. 1951, *see*

4.4–8, April 1953, *MAB.*) *Subject Headings:* **1. Agrometeorology textbooks 2. Climate of U.S.S.R. 3. U.S.S.R.**—*M.R.*

7.9–4 551.586:599.9(02)

Hadlow, Leonard Harold (*Burnage High School, Manchester, Eng.*), **Climate, vegetation and man.** London, University of London Press, **1952.** 288 p. 83 figs. **DLC**—A discussion of the direct and indirect role of climate in human life intended for the use of secondary school students. The first part is concerned with the principles determining day and night, the seasons, the distinction between climate and weather, the characteristics of the various meteorological variables and their world distribution, the physical causes of weather, the characteristics of fronts and air masses and the movement of ocean currents. Pt. 2 contains an account of the natural vegetation zones of the earth and how they are determined by climate. And Pt. 3 deals with man's response and utilization of the climatic regions of the earth to develop his economy, in particular agriculture. The book is simply written and profusely illustrated and it also contains exercises. *Subject Headings:* **1. Climate and man 2. Vegetation zones 3. Textbooks.**—*I.L.D.*

7.9–5 551.5(02):378

Polovinkin, Aleksandr Aleksandrovich, **"Pogoda i klimat" v kurse geografii V klassa.** [Weather and climate, in the geography course of the 5th grade (in secondary schools).] Moscow, Izdat. Akademii Pedagogicheskikh Nauk RSFSR, **1955.** 130 p. 78 figs. (incl. photos), tables. Price: 3r. 25 k. **DLC**—This textbook presents a course of study and an observation program for school children leading to an understanding of the basic principles of weather and climate. The book is divided into two main parts: 1) methodology and 2) clouds, precipitation, weather, air masses, forecasting, climate in general and seasonal character of weather in European U.S.S.R. The technological level of the presentation is high: about the same as would be required at an American teachers college. Subjects such as cloud physics, convective activity, wind shear, radiational cooling, latitudinal effects on climate are taken up in a quantitative manner, though without mathematical derivations beyond a knowledge of geometry. Many projects and suggestions are given for "field" work in observation or forecasting. *Subject Headings:* **1. Elementary meteorology textbooks 2. Meteorological curricula 3. Teaching of meteorology.**—*M.R.*

MONOGRAPHS AND COMPREHENSIVE PAPERS

See also: **Observatories' Yearbook, 1938,** 7.9–79; **A.N.A.R.E. Reports . . .** (Australian National Antarctic Res. Expeditions), 7.9–84; **Travel and deposition of aerosol and vapour clouds,** 7.9–128; **Forecasting data of potato blight** (Bourke), 7.9–57; **General circulation of the atmosphere** (Phillips), 7.9–142; **Climate of Bad Salzungen area** (Hattenbach), 7.9–228; **Soil erosion in Thuringia** (Schultze), 7.9–240.

7.9–6 551.509.51:551.575.5(02)

Zverev, A. S., **Tumany ikh predskazanie.** [Fog and its forecasting.] Leningrad, Gidrometeoizdat., **1954.** 73 p. 12 figs., 5 tables, 16 refs. At head of t-p: Nauchno-populiarnaia Biblioteka. **DLC**—The complicated problem of forecasting the formation, duration and dissipation of fogs is presented in the light of the latest scientific advances in this field. Pt. 1 of the book, dealing with properties of fogs and conditions of their formation and dissipation, is divided into 8 chapters which treat: 1) basic properties of fogs; 2) general information on processes of water vapor condensation and fog formation; 3, 4) formation of radiation and advection fogs; 5) formation of other types of fogs; 6) dissipation of fogs; 7) classification; 8) synoptic conditions of fog formation. Pt. 2—Fog forecasting: Ch. 1) general principles of fog forecasting; 2) estimation of cooling necessary for fog formation in a given air mass; 3) forecasts of air cooling; 4) graphic method of forecasting fog and temperature drop during the night; 5) additional remarks on fog forecasting. A number of useful nomograms and tables are presented for aid to forecasters, and their construction and use are treated. *Subject Headings:* **1. Fog forecasting 2. Fog formation.**—*A.M.P.*

7.9–7 551.508.71(02)

Penman, H. L., **Humidity.** London, The Institute of Physics, **1955.** 71 p. 19 figs., 6 tables, 22 refs., 7 eqs. (The Institute of Physics, Monographs for Students.) Price: 5 sh. Review by Malcolm Rigby, *Weatherwise*, Boston, 9(3):100, June **1956. DWB**—The various methods of measuring humidity are reviewed in this pocket size book for the benefit of students and workers in agricultural meteorology and related fields. The properties of water vapor; principles of vapor balance over water or a salt solution; basic method of hygrometry (gravimetric and volumetric); the dew-point and frost-point hygrometer; wet- and dry-bulb hygrometer; thermocouples; thermistors; use of hygroscopic materials (hair, gold-beater's skin, cone-fibers); electrolytic hygrometers; thermal, paper, sulfuric acid, cobalt salt papers, diffusion, anodized aluminum, dielectric and solid hygroscopic salt hygrometers are discussed, illustrated and their numerical characteristics are tabulated. Finally, industrial hygrometery and humidity control (air-conditioning) are treated. *Subject Headings:* **1. Humidity instruments 2. Humidity measurement techniques 3. Textbooks.**—*M.R.*

7.9–8 551.574.1 551.509.67

†Mason, B. J., **The nucleation of supercooled water clouds.** *Science Progress*, 44(175):479–499, July **1956.** 3 figs., 2 tables, 39 refs. **DWB**—A thorough discussion of the whole problem of freezing of supercooled water droplets. Very pure water freezes spontaneously at about −40°C in the laboratory, the rate increasing 6-fold for every 1°C fall of temperature. The freezing temperature of water containing foreign nuclei depends on drop diameter and on the conditions of the experiment, and diverse results by different workers are described. The mechanics of freezing is considered. Cloud chamber measures of the ice-nucleus concentration in the atmosphere are listed; the *minimum* concentration ranges from about $1/m^3$ at −10°C to $1/cm^3$ at −35°C. The nature of nuclei is discussed; silicates are suitable, BOWEN's meteoritic hypothesis is rejected. The nucleus concentration of 150/liter necessary for steady rain is attributed to splintering of snowflakes, bursting of freezing water drops and increased activity of nuclei after once being involved in ice crystal formation. Artificial ice nuclei are next considered, especially AgI and PbI_2; the apparent effectiveness of other substances (except $HgCl_2$ effective at −25°C) is due to contamination by these. *Subject Headings:* **1. Freezing nuclei 2. Cloud seeding.**—*C.E.P.B.*

7.9–9 551.506.8:633.11

†*Nuttonson, M. Y., **Wheat-climate relationships and the use of phenology in ascertaining the thermal and photo-thermal requirements of wheat, based on data of North America and of some thermally analogous areas of North America in the Soviet Union and in Finland.** Wash., D. C., American Institute of Crop Ecology, **1955.** 388 p. 154 figs., 133 tables, 177 refs. **DWB**—This is the most elaborate and best edited (and bound) volume of this monograph series (*see* 2–169, 5–94, 7–120, 10–171, 11–155, 1950; 2.1–167 to 2.1–170, 2.2–145, 2.2–146, 2.3–165, 2E–190, 1951; 3.10–261, 1952; 4.3–269, 4.5–213, 1953; 6.4–38, 1955; *MAB*). It contains a review of the knowledge of various stages in the growth and development of different varities of wheat; of the literature on wheat and climate relations in America, and on analogies with other areas of the world; and a statistical and graphical analysis and discussion of the temperature (degree-day) and illumination factors affecting wheat development in many parts of the U. S. and in northern Europe and Asia. Numerous tables and graphs and a voluminous bibliography are included. *Subject Headings:* **1. Wheat phenology 2. Agricultural climatology 3. United States 4. Canada 5. Finland 6. U.S.S.R. I. Contract Cwb-8535 II. U. S. Weather Bureau III. American Institute of Crop Ecology.**—*M.R.*

7.9–10 551.58:681.14

Copeland, John A., **Climatology by machine methods for naval operations, plans, and research.** Wash., D. C., Weather Bureau, March **1953.** 37 p. 9 figs., 12 tables. **DWB**—The history of machine methods for use in climatology, description of machines and cards (illustrated by examples from marine decks of U.S.A., the Netherlands and the Deutsche Seewarte), application to routine and special types of tabulation for operational problems (illustrated by examples of tabulation) and the purpose, scope and functions of the National Weather Records Center at Asheville, N. C., are clearly set forth in this manual which is based

on over a decade of operational experience in this field. The last chapter gives hints as to t best way to request climatological information in order to secure satisfactory services. *Subj Headings:* **1. Machine methods in climatology 2. Punched card application.**—*M.R.*

GENERAL GEOPHYSICS AND METEOROLOGY

GEOPHYSICS

7.9–11 551

Schneider-Carius, Karl and Faust, Heinrich, **Fortschritte und Probleme in der M teorologie.** [Progress and problems in meteorology.] *Naturwissenschaftliche Rundscha* Stuttgart, 9(5):169–174, May **1956. DWB**—Briefly discusses theory of cyclones, prognost charts, jet stream, general circulation, pressure and wind field, theoretical meteorolog numerical forecasting, medium range forecasting, and water drops and ice crystals (proble of artificially inducing precipitation still unsolved!). *Subject Heading:* **1. Problems in m teorology.**—*C.E.P.B.*

7.9–12 525

Gutenberg, B., **Damping of the earth's free nutation.** *Nature*, London, 177(4515):887 888, May 12, **1956.** 4 refs. **DWB**—The motion of the axis of rotation round its mean positio reaches a maximum amplitude of up to 10 m every 6 or 7 yrs and then decreases almost t zero. The question discussed is whether this is due to a "beat" of the Chandler period of 1 months with annual movements of air masses. *Subject Heading:* **1. Nutation.**—*C.E.P.B.*

7.9–13 526.

Arnold, K., **Über das mittlere Erdellipsoid.** [On the mean earth ellipsoid.] *Beitrag zur Geophysik*, Leipzig, 65(2):157–162, **1956.** fig., 7 refs., 17 eqs. **DLC**—Normal gravit by which gravity anomalies are determined enters into the STOKES formula for calculatin geoid undulations. The influence of a change of gravity flattening in the formula for norma gravity on the major axis of the spheroidal surface, on the geoid undulations and absolut departures from vertical are given. A way for improving the dimensions of the mean eart ellipsoid is shown. *Subject Headings:* **1. Earth figure 2. Gravity.**—*Trans. of author's abstrac*

I.U.G.G., IGY, WMO, UNESCO, ICAO

See also: **I.U.G.G. meeting, Rome, 1954** (Bartnicki), 7.9–25; **List of participants, 10th General Assembly of I.U.G.G.,** 7.9–26; **Met. facilities over the N. Atlantic,** 7.9–56.

7.9–14 550.3:061.

Jones, Harold Spencer (*Royal Obs., Greenwich, Eng.*), **Science on the march: International Geophysical Year.** *Scientific Monthly*, Wash., D. C., 81(2):91–94, Aug. **1955. DWB, DLC**— History of International Polar Year efforts and discussion of the IGY, 1957–8, of solar in fluences, use of rockets, studies of airglow in equatorial regions, etc. At least 36 countrie have now agreed to cooperate in this effort. *Subject Headings:* **1. International Polar Yea 2. International Geophysical Year, 1957–1958.**—*M.R.*

7.9–15 551.5:550.3:061.3

International Geophysical Year (Meteorological Office discussion). *Meteorological Magazine*, London, 85(1007):142–149, May **1956. DWB**—On Feb. 20, 1956, R. F. M. HAY described the program and objects of the IGY, especially the British contributions. A good discussion followed, in which among other subjects the importance of observations at sea and in the tropics was emphasized. Some criticisms of the program were made. *Subject Headings:* **1. International Geophysical Year program. I. Hay, R. F. M.**—*C.E.P.B.*

7.9–16 550.3:061.3(99)

Wordie, J. M., **The International Geophysical Year, geophysical station at Coats Land, Antarctica.** *Nature*, London, 177(4509):598–600, March 31, **1956.** fig. **DWB**—Map of the

region and sites of IGY bases. The ice conditions and the course of the advance supply ship "Tottan" are described. *Subject Headings:* **1. International Geophysical Year, 1957–58 2. Coats Land, Antarctica.**—*C.E.P.B.*

7.9–17 551.5:06

Swoboda, G. (*Acting Sec.-Gen. WMO*), **The first four years [of World Meteorological Organization].** *World Meteorological Organization, WMO Bulletin*, 4(2):46–51, April **1955. DWB**—A review of the gradual development and achievements of the World Meteorological Organization during the 4 years (since March 1950) of its activity is presented by the Secretary General. It deals with the growth of the WMO (from 52 initial members to 87 as of April 1955), the beginning stages of organization and activity, the difficulties and their solution, the subjects of approved studies and technical projects on hand (International Cloud Atlas) restrained by budgetary limitations, the technical assistance of the U.N. expanded program, relations with U.N. and other international organizations, and working facilities. *Subject Headings:* **1. World Meteorological Organization 2. Progress in international meteorology.**—*A.M.P.*

7.9–18 551.45:06

Dickson, B. T. (*UNESCO Advisory Committee on Arid Zone Research*), **UNESCO and arid zone problems.** *Australian Journal of Science*, Sydney, 17(6):203–204, June **1955. DLC**—A summary is presented of the various meetings of the Advisory Committee on Arid Zone research since April 1952. Brief accounts are given of the major aims of the various symposia that have been held and the roster of Australian honorary consultants on the various panels of the Advisory Committee on Arid Zone Research is presented. *Subject Heading:* **1. Arid zone research.**—*I.L.D.*

EXPEDITIONS—ARCTIC AND ANTARCTIC

See also: **A.N.A.R.E. Reports** (Australian Natl. Antarctic Res. Expeditions), **7.9–84.**

7.9–19 551.506.5(988)

Weiss, G., **Beobachtungen und Erfahrungen auf den deutschen Ostgrönland-Expeditionen 1942/1943 und 1944.** [Observations and results of the German East Greenland-Expeditions, 1942/1943 and 1944.] *Polarforschung*, Kiel, Ser. 3, 22(1/2):162–168, 1952, pub. Aug. 15, **1954. DWB**—In view of the loss of all scientific material and data of the expeditions the present report is based on personal recollections. It gives a résumé of observations made during the two expeditions of the German Sea Weather Service and concerns the weather and climate of northeast Greenland in the various seasons: velocity of winds; snowfall and snow cover; auroras, ice conditions, tidal movement and geological and morphological observations. Radio transmission conditions, discussed at the end of the paper, are shown to be subject to great fluctuations even in the course of one day. The best season was midwinter, the worst, summer and fall; the best time of the day—between 5–7 p.m. The communications were not influenced by auroras. *Subject Headings:* **1. Fragmentary climatic data 2. German East Greenland Expeditions, 1942/1943, 1944 3. Greenland.**—*A.M.P.*

7.9–20 551.311.17(988)

Haller, John, **Der Eisschild von Grönland.** [The Greenland Ice Cap.] *Leben und Umwelt*, Basel, 12(8):169–177, May **1956.** 8 figs., 2 tables. **DWB**—General description of Greenland, expeditions, ice profiles and chart of subglacial contours. Photos of ice are given. Area, mean depth, volume and details of annual hydrological balance are tabulated; the annual mass loss is estimated as about 100 km³ water, which would allow it a future life of 30,000 years. *Subject Headings:* **1. Greenland Ice Cap 2. Greenland.**—*C.E.P.B.*

7.9–21 551.311.17

Bader, Henry, **The Greenland inland ice.** *Geographical Record*, N. Y., 25(4):582–583, Oct. **1955. DWB, DLC**—Recent papers on the Greenland inland ice are summarized, including those on expeditionary logistics and the scientific reports of the French Polar Ex-

pedition. The latter include: Holtzscherer, J. J., **Contribution à la connaissance de l'inland du Groenland** and Holtzscherer, J. J. and Bauer, Albert: **Mesures séismiques.** *Subj Headings:* **1. Greenland Ice Cap 2. French Polar Expeditions 3. Greenland.**—*I.L.D.*

7.9–22 551.311.184(26

Dibner, V. D., **O proiskhozhdenii plovuchikh ledianykh ostrovov.** [Origin of the floati ice islands.] *Priroda*, Moscow, 44(3):89–92, March **1955.** 2 figs., 4 refs. **DLC.** Trans tion, with same title, by E. R. Hope, issued by *Canada. Defence Research Board, T 176* April **1955.** p. 11–14. 2 figs. **DWB**—Explains the mechanism of the formation of gia ice islands from calving glaciers in fiords, rather than from shelf ice. An example on Severna Zemlya is described. The same mechanism is claimed for ice islands formed at Greenlan and Ellesmere Island. The life expectancy of these ice islands may be about a decade or tw *Subject Headings:* **1. Foating ice islands 2. Severnaya Zemlya, Soviet Arctic.**—*A.A.*

OBSERVATORIES

See also: **Smithsonian Astrophys. Observ.** (Abbot), 7.9–44.

7.9–23 551.5:522.1(52

Saito, R., **Climatological selection of an ideal place for astronomical observation.** *Journ of Meteorological Research*, Tokyo, 7(1):1–15, March **1955.** 5 figs., 14 tables. In Japanes English summary p. 1–2. **DWB**—In the selection of a climatologically suitable site f locating an astronomical observatory in Japan the following possible meteorological hindranc must be considered: (1) meteorological conditions directly making observatories impossib include severe fog, strong wind and cloud cover exceeding 3/10; (2) conditions preventing goo observations include inferior visibility, high humidity, high wind velocity which causes fluctu tion of telescopic image and wide range of air temperature which makes focusing difficul and (3) conditions hindering proper maintenance of equipment such as snow cover, hig humidity during warm season and sea salt in the atmosphere. The values of these elemen for various districts in Japan are included. *Subject Headings:* **1. Astronomical site 2. Weather conditions 3. Japan.**—*Based on author's abstract.*

7.9–24 551.5:522.

Widorn, Th., **Die atmosphärischen Verhältnisse bei astromischen Beobachtungen in Wien** [Atmospheric conditions during astronomical observations in Vienna.] *Akademie der Wissen schaften, Vienna, Math.-Naturw. Klasse, Sitzungsberichte, Abt. IIa*, 161(5/7):157 178, **195** 7 figs., 12 refs. **DWB**—A study of atmospheric conditions restricting the possibility of makin astronomical observations has been carried out at the Observatory of the University of Vienn for different periods of the present century. It has been shown that: 1) the mean yearl number of nights considered suitable for observations (with cloudiness smaller than 4 a 9 p.m.) is 124 (period 1909–1924); 2) the degree of turbidity of the air (scale from 0, th best, to 5) varies from the maximum in Jan. to a minimum in May (1910–1933). Fiftee hundred individual evaluations made by J. REDEN from 1910 to 1932 give the followin picture: the greatest transparency occurs in Jan., Feb. and Sept., the smallest, in Nov., th other months seem to be rather uniform. Observational conditions are compared and foun to be not much worse than they are in other parts of central Europe. *Subject Heading* **1. Astronomical weather observation 2. Nocturnal cloudiness 3. Turbidity 4. Vienna Austria.**—*A.M.P.*

CONFERENCES

See also: **Hungarian Met. Soc. meeting, 1955** (Kakas), 7.9-27; **Met. facilities over N. Atlantic, 7.9–56; Precip. formation** (Saunders), 7.9–201.

7.9–25 551.5:061.

Bartnicki, Leonard, **Walne Zebranie Miedzynarodowej Unii Geodezji i Geofisyki w Rzymie (UGGI) w 1954 roku.** [General meeting of the International Geodetic and Geo physical Union in Rome, 1954.] *Przegląd Meteorologiczny i Hydrologiczny*, Warsaw, 8(2):164

166, 1955. **DWB, DLC**—The tenth (third postwar) conference of the Union was held on Sept. 14–25, 1954. About 900 representatives from 40 countries attended. Seventy papers on synoptic meteorology, cloud physics, ozone, dynamic meteorology, upper air layers, radiation and instruments were read. Two seminars were held at which the uniform and systematic development of investigations of atmospheric phenomena occurring on a large scale in meridional sections was established and the mathematical method of forecasting changes on synoptic charts was discussed. Rossby was elected chairman of the Meteorological Association. *Subject Headings:* **1. Meteorological conferences 2. I.U.G.G. meetings, Rome, 1954.**—*A.M.P.*

7.9–26 550.3:061.3:92

International Union of Geodesy and Geophysics, Rome, Sept. 14–25, 1954, **Liste provisoire des participants.** [Provisional list of participants in the 10th General Assembly, Rome, Sept. 14–25, 1954.] Rome, Consiglio Nazionale delle Ricerche, **1954.** 147 p. **DWB**—This publication contains lists of: 1) affiliated organizations and their officers; 2) delegates, guests and families of participants by countries; and, finally, 3) an alphabetical list of all those attending (except a few who came without much notice), together with brief biographical notes—field of interest, etc. (for over 1000 people who are active in various branches of geodetic and geophysical research). Thus this is one of the best sources of biographical information on current writers in these fields. *Subject Headings:* **1. I.U.G.G. meeting, Rome, 1954 2. Membership lists 3. Biography.**—*M.R.*

SOCIETIES AND INSTITUTIONS

7.9–27 551.5:061.1(439.1)

Kakas, J., **A Magyar Meteorológiai Társaság 1955. évi közgyűlése.** [Hungarian Meteorological Society meeting, 1955.] *Időjárás*, Budapest, 59(3):177–183, May/June **1955. DWB, DLC**—The 29th Hungarian Meteorological Society meeting marked the Society's 30th anniversary. This report consists mainly of a summary of executive secretary Kéri's account of the Society's recent activities and plans for the future. The trend toward applied meteorology was particularly apparent from a marked increase of activity in agricultural and medical meteorology. Cooperation with other agencies is also reported and various details of current interest are discussed. *Subject Headings:* **1. Meteorological conferences 2. Hungarian Meteorological Society.**—*G.T.*

7.9–28 551.5:061.6

†Bilancini, Raoul, **Gli studi meteorologici in Italia nel triennio 1951–1953.** [Meteorological research in Italy 1951–1953.] *Rivista di Meteorologia Aeronautica*, Rome, 15(1):3–11, Jan./March **1955.** 105 refs. French, English and German summaries p. 3. **DLC.** Also in: Italy. Servizio Meteorologico dell'Aeronautica, Il Servizio Meteorologico dell'Aeronautica Italiana alla X Assemblea Generale U.G.G.I. Rome, **1954.** p. 27–36. 105 refs. English summary p. 27. **DWB**—Institutions carrying on meteorological research in Italy and Italian publications containing meteorological papers are listed, and brief summaries are presented of meteorological studies carried out in Italy during the period 1951–1953. The fields covered include synoptic meteorology, weather forecasting, radiation, atmospheric temperature and pressure, wind studies, vapor pressure, clouds and hydrometeors, climatology, instrumentation and methods of computation and observation, atmospheric acoustics, applied meteorology, etc. *Subject Headings:* **1. Meteorological research 2. Italy.**—*I.L.D.*

SERVICES

See also: **Centennial of the Netherlands Met. Inst.** (Kühn), 7.9–45; **Internatl. Civil Aviation weather service** (Little), 7.9–55; **Agromet. Off. at Neustadt** (Bruckhardt), 7.9–58.

7.9–29 551.5:061.6

Čadež, M., **Izveštaj sa studijskog puta po Zapadnoj Nemačkoj.** [Account of a trip to West Germany.] *Yugoslavia. Hidrometeorološka Služba, Vesnik*, 4(1/2):14–23, Jan./June

1955. DWB—The author undertook a trip to West Germany under the U.N. Technic Assistance Programme. In addition to listing meteorological institutions (and their head in West Germany, he discusses his experiences and conversations concerning details of m teorological activities in Germany and their possible applications to Yugoslavia. The topi discussed fall within the headings: 1) general problems, 2) observation, 3) upper-air measur ment, 4) synoptic meteorology, 5) climatology, 6) marine meteorology, 7) instrumen 8) meteorological education, 9) libraries, 10) publication, 11) meteorology and geophysic 12) the International Geophysical Year, 13) hail control, and 14) mountain observatorie *Subject Headings:* **1. WMO. Technical Assistance Program 2. Meteorology.**—*G.T.*

7.9–30 551.5:061:355 551.58

Copeland, John Andrew, **Meteorological mission of the Army Electronic Proving Groun Paper for presentation at 138th national meeting of the American Meteorological Societ Pasadena, Calif. June 21–23, 1955.** Ft. Huachuca, Ariz., Aviation and Met. Dept., Arm Electronic Proving Ground, [1955]. 4 p. Mimeo. **DWB**—An outline of the history o the Signal Corps Meteorological Service (since 1870) and the present army organization wit its center at Fort Huachuca, Ariz. which has taken over the coordination of meteorologica or micrometeorological services for the Signal Corps, Chemical Corps, Electronic Provin Ground, Biological Warfare Testing Center, White Sands Rocket Proving Ground, Dugwa Proving Ground and the Arctic Test Station. Meteorological teams at these and other place support the work of all the Army Technical Services as a supplement to the services no provided by the Weather Bureau, Air Force, and Navy Meteorological Services. Types o work and organization are briefly discussed. *Subject Headings:* **1. Military meteorologica services 2. Micrometeorological observation.**—*M.R.*

7.9–31 551.5:06(058)(829.1

Falkland Islands and Dependencies. Meteorological Service, **Annual Report, 1954** [pub. **1955.**] [10 p.] **DWB**—Report on the general functions of the Service, forecas services at Stanley and South Georgia, reporting stations and equipment, ship reports from vessels registered in the Falklands and British Navy ships operating near the area, and from whaling vessels during 1953–54 and 1954–55 seasons, communications, climatological and othe records, organization, staff, instrumental equipment, and international cooperation. Ap pended is the budget for 4 areas, and list of staff members and duties at Stanley, S. Georgia Deception Island, Hope Bay, Argentine Islands, Admiralty Bay, Signy Bay, and of the Falk land Island Coop. Observers. *Subject Headings:* **1. Annual service reports 2. Falkland Islands.**—*M.R.*

7.9–32 551.501.9(09)(435.3)

Rassow, L., **75 Jahre Wetterstation Magdeburg.** [Seventy-five years of the Magdeburg Meteorological Station.] *Zeitschrift für Meteorologie*, Berlin, 9(11/12):322–325, Nov./Dec. **1955.** fig., 8 refs. **DWB**—Oct. 29, 1955, was the 75th anniversary of the important synoptic center at Magdeburg. History of the station and description of the site and instruments are given. The first German weather chart, issued on Dec. 12, 1880, is shown. Subsequent vicissitudes of the service are chronicled. *Subject Headings:* **1. Meteorological stations 2. Magdeburg, Germany.**—*C.E.P.B.*

EDUCATION, HISTORY AND BIOGRAPHY

EDUCATION

7.9–33 551.5:37:779

Educational films in meteorology. *Weatherwise*, 7(5):131–132, Oct. **1954. DWB**—A list of 23 films for different grades dealing with aerological aspects (icing, fog, thunderstorms, fronts, weather maps), clouds, hurricanes, tornadoes, atmospheric circulation, snow surveys, winds, etc. Brief abstracts are added. *Subject Headings:* **1. Meteorological films 2. Teaching of meteorology.**—*M.R.*

7.9–34 551.5:378

Petracchi, Gernando, **Sul valore formativo della geofisica e della meteorologia, e sulla opportunità de introdurne l'insegnamento nelle Scuole Medie.** [Educational value of geophysics and meteorology, and the opportunity of introducing them into the curricula of high schools.] *Geofisica e Meteorologia*, Genoa, 3(3):69–70, May/June **1955. DWB**—Meteorology and geophysics are valuable in developing a critical attitude, the faculty of observation and in rounding out the education of the pupil. *Subject Heading:* **1. Teaching of meteorology.**—*I.L.D.*

7.9–35 551.5:37

Wilson, James R. (*Phoenix Union High School, Arizona*), **A meteorology course in Phoenix Union High School.** *Weatherwise*, 7(5):116–117, Oct. **1954.** 2 photos. **DWB**—Experience with a one semester course in meteorology is outlined. Instrument reading and weather map drawing are the main activities. The author published an elementary textbook and a laboratory manual in meteorology. *Subject Headings:* **1. Teaching of meteorology 2. Phoenix, Arizona.**—*A.A.*

BIOGRAPHY

See also: **Edward O. Hulburt . . .** (Strong), **7.9–41.**

7.9–36 551.5:92

A. J. Connor, M.A. [Obituary]. *American Meteorological Society, Bulletin*, 36(8):421, Oct. **1955. DWB**—Abraham James Connor was Chief Climatologist of the Canadian Meteorological Service. A brief sketch of his life, of his scientific and professional activities is given. *Subject Headings:* **1. Obituaries 2. Connor, A. J.**—*I.L.D.*

7.9–37 551.5:92

James Durward, C. M. G., M.A. [Biographical note]. *Meteorological Magazine*, London, 85(1006):97–98, April **1956.** photo. **DWB**—Retired Jan. 31, 1956, after nearly 37 years in Meteorological Office. Joined Meteorological Section R.E. in June 1915, Meteorological Office April 1919. From Dec. 1926–1936 he was in charge of Meteorological Services Middle East (Cairo), 1936–1940 Director of Iraq Meteorological Service, afterwards in charge of Overseas Department of Meteorological Office. In 1948 became Deputy Director for Meteorology of the Services and liaison with Colonial Office. *Subject Headings:* **1. Biography 2. Durward, J.**—*C.E.P.B.*

7.9–38 551.5:92

Robinson, G. D., **Obituary [of] Dr. A. W. Lee.** *Meteorological Magazine*, London, 85(1006):125, April **1956.** Also: Hawke, E. L., **Dr. A. W. Lee, A.R.C.S.** *Royal Meteorological Society, Quarterly Journal*, 82(352):256, April **1956. DWB**—Died Feb. 10, 1956, in his 57th year. Studied at the Meteorology Dept. of the Imperial College of Science. Joined Meteorological Office 1923 and served at Calshot, Lerwick and Kew, and during the war as a forecaster. His work at Kew was mainly in seismology; "he was one of the world's leading authorities on microseisms." *Subject Headings:* **1. Obituaries 2. Lee, A. W.**—*C.E.P.B.*

7.9–39 551.5:92

Sutton, O. G., **Obituary [of] John Patterson, O.B.E., M.A., LL.D., F.R.S.C.** *Meteorological Magazine*, London, 85(1007):157–158, May **1956. DWB**—Achievements of the former Controller of Canadian Meteorological Service 1929–1946; died Feb. 22, 1956 in his 85th year. *Subject Headings:* **1. Obituaries 2. Patterson, J.**—*C.E.P.B.*

BIBLIOGRAPHY

See also: **Smithsonian Astrophys. Observ.** (Abbot), **7.9–44**

7.9–40 551.5:63:016

Bibliographies sommaire de météorologie agricole. [Summary bibliographies of agricultural meteorology.] *La Météorologie*, Paris, Ser. 4, No. 36:473–479, Oct./Dec. **1954.**

refs. **DWB**—The bibliography consists of lists of books: 29 on general topics, 30 on ecol of cultivated plants; 15 on studies of the habitat, 35 on spring frosts and hail, 7 on agricult warnings and 10 on miscellaneous subjects. *Subject Headings:* **1. Agricultural meteorol 2. Bibliography on agricultural meteorology.**—*A.M.P.*

7.9–41 551.5:92.0

†Strong, John, **Edward O. Hulburt, Frederick Ives Medalist for 1955.** *Optical Soc of America, N. Y., Journal*, 46(1):1–5, Jan. **1955.** port., illus. Bibliography of Edward Hulburt, p. 1–5. **DWB, DLC**—Citation given Dr. HULBURT at Optical Society meeting Pittsburgh in Oct. 1955, for distinguished work in optics is followed by a list of 109 pap (1915–1955), 25 in collaboration. They cover all phases of optics in laboratory and field, the ionosphere, upper atmosphere, aurorae, zodiacal light, radio propagation, magnetic stor etc. *Subject Headings:* **1. Bibliography of Edward O. Hulburt 2. Atmospheric optics b liographies 3. Ionospheric bibliographies. I. Hulburt, Edward O. II. Munk, Walter** —*M.R.*

7.9–42 551.5:026(4

Keil, Karl, **Über die zukünftigen Aufgaben auf dem Gebiet der Wetterdienstbibliothe und Veröffentlichungen des Deutschen Wetterdienstes.** [Future activities in the Weath Service library and publications of the German weather service.] *Meteorologische Rundsch* Berlin, 9(3/4):68–71, March/April **1956. DLC**—Before 1914 the German Meteorologic Service had a comprehensive collection of world meteorological literature. The next decad were devoted to making this useful. In 1940–45 many small collections were destroyed b the main library was saved. In 1946–55 the preparation of bibliographies and collection literature was taken up again, mainly by exchange, partly by photocopies and microfil statistics are given. For the future, new ideas must be incorporated while preserving co tinuity with the past and avoiding constant changes. *Subject Headings:* **1. Meteorologic libraries 2. German Meteorological Service Library.**—*C.E.P.B.*

7.9–43 634.9:019.9

†**Forestry Abstracts,** Oxford, Vol. 1, **1939–.** Latest issue seen, Vol. 17, No. 2, April **195** Quarterly. Prepared by the Commonwealth Forestry Bureau, Oxford. Published by th Commonwealth Agricultural Bureau, Farnham Royal, England. Price: annual, domesti 60 sh. Also: R., F——, **The literature of forestry: an appraisal.** *Ibid.*, 16(2):157–16 April **1955.** 6 tables. **DLC**—The abstracts cover the world literature on forestry includi the scientific, industrial, economic, social, and political aspects. One section, factors of th environment, deals with meteorology, the climate and microclimate of forests and with so physics, in particular soil moisture. All the abstracts are annotated. *Subject Heading* **1. Forestry 2. Forestry abstracts 3. Meteorology 4. Forest microclimatology.**—*I.L.D.*

HISTORY

See also: **Historic droughts** (Antevs), 7.9–232.

7.9–44 012:061.6:523.7:551.521.1(73

†Abbot, Charles G., **Leading operations of the Smithsonian Astrophysical Observatory 1895–1955.** *Smithsonian Miscellaneous Collection*, 131(2), Sept. 22, **1955.** 8 p. **DLC**— The author lists 63 research reports, inventions or discoveries which have been made unde his initiative at the Astrophysical Observatory between 1900 and 1954, as well as 7 by L. B ALDRICH, 6 by F. E. FOWLE, and 6 by W. H. HOOVER; citing references to published work wherever pertinent. The wide range of subject matter can be seen from the list. *Subject Headings:* **1. Smithsonian Astrophysical Observatory 2. Astrophysics 3. Solar radiation 4. Research institutes.**—*M.R.*

7.9–45 551.5:061.1(09, 492)

Kühn, L., **Stulecie istnienia krolewskiego Instytutu Meteorologicznego w Holandii** [Centennial of the Netherlands Meteorological Institute.] *Przegląd Meteorologiczny i Hy-*

rologiczny, Warsaw, 7(1/2):79–80, 1954. **DWB, DLC**—The Institute organized on Jan. 30, 854 in Utrecht had Dr. H. D. Buys Ballot as its first director (for thirty years). Its beginning was very modest—4 scientific workers, 6 observers. In 1897 it was transfered to De Bilt. At present it consists of 6 departments. The first department includes marine meteorology and oceanography, the others deal with instruments, synoptic meteorology, also terrestrial magnetism and problems connected with the ionosphere. A section on agricultural meteorology has been established within the Dept. of Climatology. Prof. F. A. Vening Meinesz, president of the Institute read a report on the development of meteorology and associated sciences during the festivities. A "Buys Ballot" medal was awarded to G. Swoboda, chief secretary of the WMO, for his work in meteorology, especially in the field of international cooperation. *Subject Headings:* **1. History of meteorological services 2. Netherlands Meteorological Service.**—*A.M.P.*

7.9–46 551.501.1(09)

Rojecki, Ananiasz, **O najstarszych instrukcjach meteorologicznych w jezyku Polskim.** [The oldest meteorological instructions published in Polish.] *Przegląd Meteorologiczny i Hydrologiczny*, Warsaw, 8(2):147–162, **1955.** 16 refs. Russian and French summaries p. 161–162. **DWB, DLC**—In his previous paper, published in 1936, the author indicated that one set of instructions for meteorological observation was published in 1817 (a translation from Russian instructions published in 1812). Further research by the author revealed that earlier instructions by Tadeusk Czacki had been published about 1805. Other instructions were written between 1803 and 1813 by Joseph Mickiewicz, Professor of Physics of Wilno Univ., but were never published. The latter instructions, in manuscript form, were found by the author in the Czartoryski Library, 2 extracts from it concerning air temperature and atmospheric pressure observations are appended. *Subject Headings:* **1. Instruction for observers 2. Historic observers manuals 3. Poland.**—*A.M.P.*

7.9–47 912

Stocks, Theodor, **Fragen der thematischen Kartographie.** [Questions of thematic cartography.] *Petermanns Geographische Mitteilungen*, 99(4):309 317, **1955.** 23 refs. **DLC**—The difference between pure and thematic cartography is that the latter shows the distribution of abstract or nongeodetic objects and phenomena, especially such as have a spatial distribution but are not entirely localized. Humboldt's isotherm charts (1817) were the first; a few other meteorological examples are mentioned. *Subject Headings:* **1. Cartography 2. Isothermal charts 3. History of climatography.**—*C.E.P.B.*

PRACTICAL AND APPLIED METEOROLOGY

MARINE METEOROLOGY AND OCEANOGRAPHY

See also: **Sea temp. at Trieste** (Polli), 7.9–170; **Heat budget of water column** (Stommel), 7.9–171; **Wave observations, N. Atlantic** (Dorrestein), 7.9–182; **Met. aspects affecting operation of trawlers north of Iceland in winter** (Hay), 7.9–183; **Wind generated waves** (Pierson), 7.9–184.

7.9–48 551.46

Linčikin, P. S., **Ob opredelenii tolshchiny baroklinnogo sloiia moria.** [Determination of thickness of the baroclinic layer of the sea.] *Akademiia Nauk, SSSR, Doklady*, 101(3):461–464, March 21, **1955.** fig., 24 eqs. **DLC**—The author proposes a hydrodynamic theory of wind currents in the sea which reveals hitherto unknown characteristics of the velocity and density fields of a fluid. Equations are developed for determining the quantitative characteristics of gradient convection currents produced by winds as well as the theorem of the baroclinic layer of the sea which exceeds the Ekman depth friction for given assumed parameters by 22 times. *Subject Headings:* **1. Physical oceanography 2. Baroclinic layer of the sea.** – *I.I.D.*

7.9–49 551.463:551.50

Abe, Tomasaburo (*Met. Res. Inst., Japan*), **On the mechanism of the decay of bubbl and their size distribution in foam layer of sea water (A study on the foaming of sea wate** *Records of Oceanographic Works in Japan, Tokyo*, N.S., 2(1):1–6, March **1955.** 2 figs., 3 tabl 5 refs., 6 eqs. **DWB**—Since the estimates of Beaufort Force of the wind and of wave heigh depend to some extent on the amount of foam visible when breakers occur, and this depen on the rate of decay of bubbles which differs with different salinities, it is important to ha quantitative studies of the relationships between foam decay, chlorinity and temperature sea water. The present study gives in graphs and charts the results of empirical and theoretic calculations of the rate of decay of bubbles at temperatures from 5° to 29°C and 9.63 to 19.26 Cl, and of the frequency distribution of the size of bubbles. *Subject Headings:* **1. Sea foa decay rate 2. Beaufort scale estimation.**—*M.R.*

7.9–50 551.4

Stommel, Henry, **Direct measurements of sub-surface currents.** *Deep-Sea Researc* London, 2(4):284–285, July **1955. DWB**—Observations of subsurface currents from anchore or moored current recorders, by following submerged floats by ship, by clouds of dye or radi active material, by radio location or by loran tracking of buoys are not practicable for variou reasons. By using subsurface buoys (launched from ocean weather ships) which wou release time bombs at set intervals and using tripartite sofar methods to locate the positio of the explosion, a method analogous to the constant-level balloon technique could be attaine enabling the oceanographer to construct synoptic charts of currents at various depths coordinate with surface current wind and meteorological data, and to understand the dynamic of the deep sea. Perhaps currents are broad and smooth or maybe narrow and jet like places with rapid fluctuations. This could be determined only by such a method. *Subje Headings:* **1. Subsurface current measurement techniques 2. Sofar 3. Ocean weather ship 4. Oceanographic observation.**—*M.R.*

7.9–51 551.465:551.55

Wyrtki, Klaus, **Die Dynamik der Wasserbewegungen im Fehmarnbelt.** [Dynamics o the water movements in the Fehmarnbelt.] *Kieler Meeresforschungen*, Kiel, 9(2):155–17 **1953** and 10(2):162–181, **1954.** figs., tables, bibliogs. **DWB**—These two articles compris a detailed and systematic study of the oceanographic conditions and water movements i the Belt between the Baltic and the Kattegat. Density differences, which are pronounce when weather is calm, specially in summer when runoff is greatest from fresh water source into the Baltic, exist between the Baltic and North Sea and also between surface waters an deep waters in the Baltic. Any storm of consequence, however, mixes the surface water wit the deep water and also produces wind driven and related currents from North Sea to Baltic or vice versa. When storms occur in winter, the water level differences are even greater an the movements and mixing complete from sea surface to the bottom of the sea. In winter then, the salinity differences are less than in summer. Many graphs and tables based o 1952 data are presented to show weather effects on water movements through the Grea Belt in different seasons and weather types. *Subject Headings:* **1. Salinity distributio 2. Wind driven currents 3. Weather type effects on sea 4. Baltic Sea 5. The Belts.**—*M.R.*

7.9–52 551.468(711)

Pickard, G. L. (*Inst. of Oceanog., Univ. of British Columbia, Vancouver*), **British Columbia inlets.** *American Geophysical Union, Transactions*, 36(5):897–901, Oct. **1955.** fig., 5 refs. **DWB, DLC**—The Institute of Oceanography of the University of British Columbia has been studying the oceanography of the inlets of the British Columbia coast since 1951. Temperature, salinity, and oxygen content are determined by routine methods on board ship. Internal waves have been studied with bathythermographs in deeper water, and with a resistance thermometer near the surface. Vertical current profiles have been measured with CBI drags and Ekman meters, while surface currents have been recorded by photographing dye patches. The possibilities of identifying water masses by plankton distribution or by

tionic ratios are also being investigated. *Subject Headings:* **1. Oceanography of inlets 2. British Columbia Coast.**—*Author's abstract.*

AERONAUTICAL METEOROLOGY

See also: **Effect of aircraft exhaust on airport visibility** (Appleman), 7.9–250.

7.9–53 551.501.7:551.507.352:629.13

*Cook Research Laboratories, Skokie, Ill., **Military and civil scheduled aircraft weather reconnaissance capability.** Contract AF 33(038)-23324, Interim Progress Report, PR 17-25, May 17, 1955. 19 p. [+54 p. of tables]. 20 figs. (1 fold.), 12 refs. **DWB**—A detailed analysis of scheduled civil and military flights over the North Atlantic during March 1954 shows that there is some dispersion in regard to space and time concentration (e.g., a better distribution occurs from 00 to 0600Z and a poorer at 1200–1800Z than at 06–12 or 18–24, and some difference occurs from one day of the week to another), but all told a better weather reporting system would be obtained by training crews and equipping planes with good instruments and recorders, than is obtained with the present radiosonde network—at least for numerical analysis, flight planning and forecasting. *Subject Headings:* **1. Aircraft weather reconnaissance systems 2. Aircraft weather reports 3. North Atlantic air routes.**—*M.R.*

7.9–54 551.501.7:551.507.352:629.13

Cook Research Laboratories, Skokie, Ill., **Integration of weather forecasting, flight planning and flight watch.** Contract AF 33(038)-23324, Interim Progress Report, PR 17-16, June 23, 1955. 42 p. 18 figs. **DWB**—Report covers organization of flight control center, weather forecast and jet stream charts, and optimum flight planning using gradient concept, time fronts and time front computers; determination of optimum altitude, en-route procedures and instrument aids. Actual tests of methods are reported in addition to the general or schematic discussion and outline. *Subject Headings:* **1. Flight planning 2. Aircraft weather reconnaissance systems. I. Contract AF 33(038)-23324.**—*M.R.*

7.9–55 551.5:061.3:629.13

Little, Delbert Morse, **Weather service for International Civil Aviation.** *U. S. Dept. of State, Bulletin,* 31(805):822–827, Nov. 29, 1954. Abstracted from reprint. **DWB**—History of IMO, Commission for Aeronautical Meteorology and ICAO, Meteorological Division. Joint sessions were held in 1947 and 1950 and another joint meeting, with ICAO Meteorological Division and WMO Commission on Aeronautical Meteorology at Montreal June 15 to July 14, 1954. Twenty-nine countries and observers from 3 nongovernment organizations participated. D. M. Little of the U.S.W.B. was chairman. A few separate meetings were held by each of the two participating organizations. Recommendations and work of both separate and simultaneous sessions are discussed. Codes, manuals, reports, networks; and needs for turbulence, jet stream, high level wind and aeronautical climatology research were discussed. *Subject Headings:* **1. International aeronautical meteorological services 2. Aeronautical meteorology conferences 3. ICAO conference. I. WMO. Commission for Aeronautical Met. II. ICAO. Meteorological Division.**—*M.R.*

7.9–56 551.5:629.13:061.3

Meteorological facilities over the North Atlantic. *World Meteorological Organization, WMO Bulletin,* 4(1):19–20, Jan. 1955. **DWB**—Report on 3rd North Atlantic Meeting of ICAO at Montreal Oct. 5, 1954. WMO was represented by A. H. Nagle, President of the Commission on Aeronautical Meteorology and by J. R. Rivet, Deputy Secretary General. Fifteen of the 35 recommendations adopted by the Meteorological Committee concern WMO—mostly relating to observations, networks for exchange across Atlantic, Arctic station and reports, ocean weather ships, high altitude radiosonde observation; telecommunication New York-Santa Maria-Paris and to Iceland and information to be transmitted to or from planes in flight. *Subject Headings:* **1. Aeronautical meteorology conferences 2. ICAO conference—Montreal, Oct. 1954 3. North Atlantic weather service 4. North Atlantic.**—*M.R.*

AGRICULTURAL METEOROLOGY

See also: **Plant ecology** (UNESCO), 7.9–1; **Fundamentals of met. and climatology** (Kostin), 7.9–3; **Wheat-climate relationships** (Nuttonson), 7.9–9; **Agricultural met. bibliog.**, 7.9–40; **Sandy soil temps.** (Ando), 7.9–168; **Factors determining yield of meadows** (Klapp, Boeker), 7.9–221; **Soils and agriculture of Angola** (Azevedo), 7.9–239.

7.9–57 551.509.5:632.9:633.4

†Bourke, P. M. Austin, **Forecasting from weather data of potato blight and other pla diseases and pests: first report of the Working Group on Weather and Plant Patholo Problems, of the Commission for Agricultural Meteorology** [of the W.M.O.]. *World M teorological Organization*, [*Pub.*]. No. 42, TP 16; *Technical Note*, No. 10, **1955.** 48 6 figs., 2 diagrs., 116 refs. French, Russian and Spanish summaries, preceding p. 1. **DWB** Existing methods of forecasting outbreaks of potato blight, based on answers to questionnair received from 27 countries. The "late blight" or *Phytophthora infestans* is the most importa epidemic disease affecting the potato crop in Europe (Ireland, 1856) and other parts of t world (recently). A map shows areas affected. The forecasting is intended to indica optimum times for spraying. Dutch, English, Irish, American, and French forecast metho (applied in those and other countries) are reviewed in detail, and then an integrated summar of weather-plant-disease relations in general and of methods of expressing criteria in bulleti and warning is presented. Excellent bibliography. *Subject Headings:* **1. Potato blig forecasting 2. Plant disease-weather relationships. I. World Meteorological Organizatio Commission for Agricultural Meteorology.**—*M.R.*

7.9–58 551.501.9:63(43) 551.584:634

Burckhardt, H., **Tätigkeitsberichte der Agrarmeteorologischen Dienststellen, Neusta a.d. Weinstrasse.** [Activity report of the Agrometeorological Office at Neustadt a.d. Wein strasse.] *Germany. Deutscher Wetterdienst, Mitteilungen*, 2(14):71–83, **1955.** 7 figs. **DW** —This agro-meteorological station serves the Rhineland-Pfalz government. Studies wer carried out on the changes in stand and soil climate of vineyards under the influence of irriga tion, and the effect of these changes upon maturity of vine and grapes. The activities include also microclimatic investigation for planning wind shelter installations, microclimate studie and mapping in relation to frost protection and mapping of frost damage in viticulture area In addition, moisture balance of the soil was studied with the Popov evaporimeter; soil tem perature was investigated. Various special services of the station such as climatic studies fo evaluation of farming land, advice on rick climate, etc. are described. Special activities fo 1955 include studies on the nocturnal cold air flow on slopes and the possibility of dammin it, the effect of vine growth upon stand climate in vineyards. *Subject Headings:* **1. Agro meteorological stations 2. Microclimatological research 3. Vineyards 4. Bonn, Germany** —*I.L.D.*

7.9–59 551.509.62:63

Damario, Edmundo A. and Pascale, Antonio J., **El calentamiento del aire en la lucha contra las heladas primaverales para la protección de los montes frutales en el valle del Rio Negro.** [Heating of the air to prevent spring frosts and to protect the mountain orchards in the Rio Negro valley.] *Meteoros*, Buenos Aires, 5(3):185–206, July/Sept. **1955.** 7 figs (incl. photos), 11 tables, 8 refs. Spanish and English summaries p. 185. **DWB, DPU**—The results of various attempts at heating the air during nights of threatened frost carried out during July and Aug. are presented. Two types of heaters with different densities and con structions were used. The North American type of heater with a density of 100 heaters per surface raising the air temperature about 2.6°C to 3.0°C was found most suitable. Diagram of the heater arrangement and photographs of the heaters in operation, and extensive tabula and graphical data are given. *Subject Headings:* **1. Frost damage prevention 2. Orchard heating 3. Argentina.**—*I.L.D.*

7.9–60 551.586:63

Gellert, Johannes F., **Geographische Natur und Struktur der Viehwirtschaft in Angola** [Geographic characteristics and the structure of the animal husbandry of Angola.] *Leipzig*

Deutsches Institut für Länderkunde, Wissenschaftliche Veröffentlichungen, N.F., No. 13/14:237 250, 1955. map, 12 refs. **DLC**—The effect of the Benguela Current and the mountains and plateaus of Angola on the climate—especially precipitation—and the effect of the precipitation on natural vegetation and soil fertility, etc. on cultivation and eventually on cattle or sheep raising is discussed at some length and several references to literature on the climate of S.W. Africa are cited. Temperature in various seasons and regions is also considered in relation to suitability for European and domestic cattle, especially on the high plateaus. *Subject Headings:* **1. Regional climatology 2. Animal husbandry 3. Angola.**—*M.R.*

FOREST METEOROLOGY

See also: **Forestry Abstracts, 7.9–43.**

7.9–61 551.509.58:632.187

Beers, Francis D., **Use of prognostic charts in forecasting relative humidities in the Portland Fire Weather District.** (In: U. S. Weather Bureau, **[Papers presented at the Fire Weather Meeting, Portland, Oregon, Feb. 1955.]** 12 p. Carbon of typescript.) **DWB**—During 1954 fire weather season, 70% of the cases studied showed significant relative humidity changes coinciding with 500 mb height changes (at Tatoosh Island, Wash.). Little relation was found between relative humidity changes and variation in the surface pressure gradients between Portland and the Pacific Coast. Thirty-hour surface prognostic charts would be of little value in preparation of relative humidity forecasts for the next day. Low humidities along west slope of the Cascades in July and Aug. coincide with frequency and intensity of N winds at Eugene and Portland and must be due to subsidence as short wave ridges cross the West Coast region. *Subject Headings:* **1. Fire weather studies 2. Humidity forecasting 3. Western, Oregon.**—*M.R.*

7.9–62 551.509.58:632.187

Nelson, Ralph M., **How to measure forest fire danger in the Southeast.** *U. S. Forest Service. Southeastern Forest Experiment Station, Asheville, N. Carolina, Station Paper*, No. 52, March **1955.** 22 p. forms. **DWB**—This manual covers selection of sites for stations, installations of equipment in coastal plain, piedmont and mountains, and in open and wooded exposures, respectively; how to measure fuel moisture, wind and rain, errors in measurement, time of measurement, operation of meters, keeping of records, inspection and training, and a list of suppliers of fire weather equipment. A useful table by J. J. KEETCH gives anemometer height recommended for height (10–70 ft) and distance (10–500 ft) of obstructions. The fire danger rating meter was also developed by J. J. KEETCH for this region. *Subject Headings:* **1. Fire danger rating 2. Fire weather services 3. Forest meteorology 4. Manuals 5. Eastern United States.**—*M.R.*

7.9–63 551.524.36:632.187

Turnock, W. J. (*Canada. Dept. of Agri., Winnipeg*), **A comparison of air temperature extremes in two tamarack sites.** *Ecology*, Durham, N. C., 36(3):509–511, **1955.** tables, refs. **DWB, DLC**—Two thermographs were installed in a mixed and pure tamarack stand in a bay near Prince Albert, Saskatchewan, during the summer of 1953. The mean maximum and minimum temperatures in both stands during the period April–July are given in a table. *Subject Headings:* **1. Temperature extremes 2. Tamarack stands 3. Prince Albert, Canada.**—*I.L.D.*

INDUSTRIAL AND MEDICAL METEOROLOGY

See also: **Meteorotropic dependence of poliomyelitis, Oberlausitz region** (John), 7.9–155; **Solar furnace, Mont-Louis** (Trombe), 7.9–158; **Condensation nuclei in hygienic res.** (Effenberger), 7.9–192; **Biological effects of radioactivity** (Libby), 7.9–262.

7.9–64 551.521.1:621.47

*Bleksley, A. E. H., **Utilisation of solar energy.** *South African Journal of Science*, Johannesburg, 52(2):37–41, Aug. **1955.** fig., 3 tables, 5 refs. **DWB**—Available amounts of solar

energy, especially in South Africa, are discussed and some quantitative data given to use estimating the effectiveness of the solar furnace or house in different places or seasons. Th different methods of collection (low temperature, high temperature and direct conversio 10 direct methods of utilization, 6 indirect methods, and 4 methods of storage are outli and discussed. *Subject Headings:* **1. Solar energy utilization 2. Solar energy availabil 3. South Africa.**—*M.R.*

7.9–65 551.5

Collins, George F. (*E. I. du Pont de Nemours & Co., Wilmington, Del.*), **Application meteorological skills in the duPont Company.** *American Meteorological Society, Bullet* 36(4):167–170, April **1955.** 6 figs. **DWB**—The author describes the application of m teorological principles to the control of atmospheric pollution, the behavior of winds wi reference to wind loads on structures, design of cooling period or waste reservoir and the u of climatic data for stocking inventories, and the use of short range forecasts for constructi charts for determining wind-pressure variation and elevation and showing rainfall intensi for use in runoff problems are included. *Subject Headings:* **1. Industrial meteorolog 2. Chemical industries.**—*I.L.D.*

7.9–66 551.5:662.

Krick, Irving P. (*American Inst. of Aerological Res., Denver*), **Weather and the ga requirement.** *Gas Age*, New York, 119(10):37–40, May 19, **1955.** 4 figs., 5 refs. **DLC**— Examples of basic climatological studies and forecast methods used in supplying gas companie with information necessary for estimating loads, either in next 24 hours or several days ahea are cited and illustrated. Temperature (degree-days below 65°) is not the sole factor— cloudiness, rainfall, wind, etc. can be forecast or integrated by machine methods to give th utility a "load factor" which, though not 100% accurate, is much better than present estimate based on generalized Weather Bureau forecasts. In some cities engineers have meteorologica training, in some the utility hires meteorologists, in others they use the services of industria consultants such as KRICK's. *Subject Headings:* **1. Industrial meteorology 2. Gas consump tion forecasts.**—*M.R.*

METEOROLOGICAL OBSERVATIONS AND INSTRUMENTS

METHODS OF OBSERVATION

See also: **Soil-moisture measurem.** (U. S. Forest Service), 7.9–2; **Magdeburg met. station** (Rassow), 7.9–32; **Oldest Polish met. instructions** (Rojecki), 7.9–46; **Mechanism of bubble decay** (Abe), 7.9–49; **Sub-surface current measurem.** (Stommel), 7.9–50; **Aircraft weather reconnaissance** (Cook Res. Lab.), 7.9–53; **Met. observations with captive balloon** (Akita), 7.9–88; **Determination of hourly solar radiation values** (Whillier), 7.9–161; **Temp. distribution in atmos.** (Burdecki), 7.9–166; **Rainfall frequencies** (Sudan Met. Serv.), 7.9–206; **Radio measurem. of meteor orbits** (Davies), 7.9–248.

7.9–67 551.501:551.578.7

Feteris, P. J., **The need for detailed information on the characteristics of hailstones.** *Weather*, 11(4):107–109, April **1956.** fig. **DWB** –Details required are time and duration of hailstorm in minutes, amount of hail and area covered, size of largest and of smaller hailstones, description of shape and outer appearance, and absence or presence of very close lightning. *Subject Heading:* **1. Hail observation techniques.**—*C.E.P.B.*

7.9–68 551.501:551.577

†Grunow, Johannes, **Probleme der Niederschlagserfassung und ihre Bedeutung für die Wirtschaft.** [Problems of rainfall estimation and its economic importance.] *Meteorologische Rundschau*, Berlin, 9(3/4):62–68, March/April **1956.** fig., numerous refs. **DLC**—Problems of determination of water resources are being examined at Hohenpeissenberg. Author discusses here the errors of rainfall measurement. The effect of wind eddies caused by the gage, thei

riation with height of gage above ground, and neutralization by preserving an undisturbed nd field are considered. The errors due to a horizontal gage opening on a slope, sheltering d overexposure due to buildings, trees, etc. and the carrying over of precipitation in moun- ins are discussed. Finally, the storing of precipitation in winter, and additional water due t deposition of fog rain, are considered. An extensive bibliography of recent literature is pended. *Subject Headings:* **1. Precipitation estimation 2. Hohenpeissenberg, Germany.** *-C.E.P.B.*

7.9–69 551.501.4:551.521.1:551.576

†Albrecht, Fritz H. W. (*10 Belgravia Ave., Melbourne, Australia*), **Methods of computing lobal radiation.** *Geofisica Pura e Applicata*, Milan, 32:131-138, Sept./Dec. **1955.** 4 figs., tables, 17 refs., 8 eqs. German summary p. 131. **DWB, DLC**—With A. ÅNGSTRÖM's rmula expressing the influence of the amount of cloudiness c_T on monthly mean values of obal radiation $I-D$: $I-D=(I-D)_0[1-(1-\eta)c_T]$ very different values were found for ne magnitude η in different months and places. In this paper formulas existing for computa- on of global radiation are compiled and a method is given for the calculation of η from the tio of the amounts of total and low altitude cloudiness c_T/c_L and the maximum height of the n. This new formula for the global radiation seems to be valid for all parts of the world ith unchanged constants. *Subject Headings:* **1. Global radiation calculation 2. Cloud fects on radiation.**—*Author's abstract.*

7.9–70 551.501.4:551.521.3:551.574.1

Penndorf, Rudolf, **Mie scattering coefficient for water droplets in air.** *Journal of Me- orology*, Boston, 13(2):219-220, April **1956.** fig., table, ref. **DWB**—New computations of cattering by water particles of different size parameters ($2\pi r/\lambda$) are tabulated. *Subject eadings:* **1. Water droplet scattering 2. Mie scattering.**—*C.E.P.B.*

7.9–71 551.501.4:551.577

Schneider-Carius, K., **Bemerkungen zur kartemässigen Darstellung der Niederschläge.** Remarks on cartographic representation of precipitation.] *Zeitschrift für Meteorologie*, erlin, 9(11/12):348–350, Nov./Dec. **1955.** table, 2 refs. **DWB**—Drawing isohyets for alues with intervals increasing logarithmically upwards is recommended. Suggested rounded ff values are shown. This would facilitate interpolation. *Subject Heading:* **1. Precipitation artography.**—*C.E.P.B.*

7.9–72 551.501.45:551.583.13

Schulze, Alfred, **Eine Methode zur Erfassung von Jahresgängen mit praktischer An- endung auf Lufttemperatur und Niederschlagsmenge in Europa.** [A method for expressing nnual variations with practical application to air temperature and precipitation in Europe.] *'etermanns Geographische Mitteilungen*, Gotha, 100(1):34–39, **1956.** 2 figs., 2 fold. plates, tables, 14 refs. **DLC**—The variation of an element is an important factor of climate. Author escribes an "Annual variation index" Z. The absolute value Za is given by $\Sigma_{I}^{XII}\,Aa$, where a is the departure of each monthly mean from the annual mean of temperature or annual otal/12 of precipitation. The relative value Zr is $100Za/J$ where J is the annual mean or sum. llustrative values are discussed. Large folding charts show Zr of temperature and precipita- on for Europe and adjoining parts of Asia and Africa. Temperature values range from 0 to 170 and precipitation values from 15 to 120. *Subject Headings:* **1. Annual variation index . Temperature variation 3. Precipitation variation 4. Europe.**—*C.E.P.B.*

7.9–73 551.501.7:551.508.822

Hinzpeter, Max, **Physikalische Gegebenheiten der aerologischen Messtechnik.** [Phys- al conditions of aerological measurement technique.] *Meteorologische Rundschau*, Berlin, (3/4):55–58, March April **1956.** fig., 2 tables, 5 refs., 15 eqs. **DLC**—The conditions under hich radiosonde ascents are made are discussed. Subjects are the hydrodynamics of the alloon-r couple, thermometer lag and radiation errors. The ventilation rates to give inimum temperature errors at different solar angles, heights and temperature gradients are abulated. *Subject Heading:* **1. Radiosonde operation.**—*C.E.P.B.*

7.9–74 551.501.7:551.557.36:551.547.3:5

Jenkinson, A. F., **The relation between standard deviation of contour height and stand vector deviation of wind.** *Royal Meteorological Society, Quarterly Journal*, 82(352):198–. April **1956.** 7 figs., 4 tables, 5 refs., 10 eqs. **DWB**—Standard vector deviations of win kt (σ) are related to standard deviations of contour hts (ft) from 850–100 mb (s) at a num of places in the N. Hemisphere by $\sigma = ks \operatorname{cosec} \phi$, where ϕ is the latitude. From 850– mb $k = 0.064$; from 300 100 mb k decreases linearly to 0.033. World maps of computed S immediately above the friction layer and at 500 mb are given for Jan., April, July and O and agree well enough with observations. (For abstract of earlier version, *see* 6.5–203, M 1955, *MAB*.) *Subject Heading:* **1. Upper air wind variability.**—*C.E.P.B.*

7.9–75 551.501.7:551.

Measurement of humidity at high altitudes (Royal Meteorological Society Discussio *Meteorological Magazine*, London, 85(1007):151–152, May **1956.** 2 refs. **DWB**—Account a discussion on Feb. 15, 1956, opened by A. W. Brewer. The frost point hygrometer and pressure-increase modification were described. Figures were given of the low frost point the stratosphere at 50,000 ft. These could only be explained by the air having been coo to those temperatures at some time. This only occurred in the equatorial tropopause a winter polar stratosphere. Other speakers dealt with the measurement of precipitable wa by radiation and by balloon-borne spectrograph, and forms of ice at low temperatures. *Sub Headings:* **1. Humidity measurement techniques 2. Upper air humidity.**—*C.E.P.B.*

7.9–76 551.501.8:551.510.535:551.3

Rogers, G. L., **A new method of analysing ionospheric movement records.** *Natu* London, 177(4509):613–614, March 31, **1956.** 2 figs., 10 refs., 2 eqs. **DWB**—A process described for scaling down a radio wave pattern for optical examination. It is suitable f investigating a smooth reflecting ionosphere with small imperfections moving across or bel it. The method was tested in Wellington, N. Z. It shows that objects far below the ion sphere can make significant contributions to ionospheric movement records. *Subject Headin* **1. Ionospheric wind measurement.**—*C.E.P.B.*

OBSERVATIONAL DATA

See also: **Wheat-climate relationships** (Nuttonson), 7.9–9; **German E. Greenland Exp. 1942–43, 1944** (Weiss), 7.9–19.

7.9–77 551.506(41

Booth, R. E., **Weather of 1955.** *Meteorological Magazine*, London, 85(1006):101–10 April **1956.** 6 figs., ref. **DWB**—The year was cold at first, warm later, and generally dr and sunny. The situation was mainly anticyclonic; mean pressures over N. Atlantic a W. Europe are shown for Jan., Feb., March, July, Aug., Sept. **Highlights of the year** inclu heavy snow in Scotland in Jan. and Feb., and a rainfall of 11″ in 24 hours on July 18 at Martin town, Dorset. *Subject Headings:* **1. Weather 2. British Isles.**—*C.E.P.B.*

7.9–78 551.506:551.524.3

*Garnier, Marcel, **Contribution à l'étude des gelées en France.** [Contribution to th study of frosts in France.] *La Météorologie*, Paris, Ser. 4, No. 36:369–378, Oct./Dec. 1954 5 figs., 5 tables. French, English and Italian summaries p. 369. **DWB**—Contains informatio and maps of the distribution in France of: 1) mean dates of early frosts in fall, 2) mean date of late frosts in spring, 3) mean lengths of frostless periods, 4) latest dates of frosts in spring and 5) shortest duration of frostless periods in the warm season. A discussion of the vari ability of the above mentioned data with indication of their earliest and latest onset date and their amplitude completes the paper. *Subject Headings:* **1. Frost data 2. Frost fre period 3. France.**—*A.M.P.*

7.9–79 551.506(058)(410) 550.38(058)

*The Observatories' Year book, 1938. Comprising the meteorological and geophysica results obtained from autographic records and eye observations at the Lerwick, Aberdeen

kdalemuir, Valentia, and Kew Observatories, and the results of soundings of the upper nosphere by means of registering balloons. London, H.M.S.O., 1955. 223 p. 21 figs., merous tables. At head of t.-p. M.O. 578. Price: £4. **DLC**—Publication of this Yearbook, spended since 1937, is resumed in abridged form, less tabulations of hourly values being ailable at the Observatories. This volume contains daily, monthly and annual values of mospheric electricity, geomagnetism and aurora at Lerwick and of the climatological elements Aberdeen, Eskdalemuir, Valentia and Kew. The aerological section gives details and sults of all sounding balloon ascents. *Subject Headings:* **1. Meteorology yearbooks 2. Geo-agnetic yearbooks 3. British Isles.**—*C.E.P.B.*

7.9–80 551.506

Schneider-Carius, Karl, **Wettererzeugende Bewegungen in der Lufthülle.** [Weather-nerating movements in the atmosphere.] *Forschungen und Fortschritte*, Berlin, 30(5):137–42, May **1956.** 2 figs., table, 10 refs. **DLC**—A general account of the relation between inds and weather changes. These are due mainly to vertical motion, which is only striking in understorms. After a historical introduction, sections deal with cyclone models, upper air inds, circulation between anticyclones and cyclones, and jet streams. The importance of geostrophic components is stressed. *Subject Heading:* **1. Weather.**—*C.E.P.B.*

7.9–81 551.506:654.196:656.6

Seilkopf, H., **Tägliche Berichterstattung über das Wetter in der Heimat für deutsche chiffe in der Norddeicher "Schiffspresse."** [Daily reports of weather in home ports for erman ships in marine broadcasts from North Dyke.] *Wetterlotse*, Hamburg, No. 99:71–72, pril **1956. DLC**—Discussion of extracts from Hamburg **Abendblatt** included in broadcasts ships from North Dyke in Jan. 1954. *Subject Headings:* **1. Marine weather broadcasts Hamburg, Germany.**—*C.E.P.B.*

7.9–82 551.506.1(058)(673) 551.506.7(058)(673)

*Angola. Serviço Meteorológico, **Observações meteorológicas de superfície em Angola, 953.** [Meteorological surface observations in Angola, 1953.] pub. **1954.** 113 p. almost ntirely tables. **DWB**—Continuation in part of its **Elementos Meteorológicas e Climato-gicos,** pub. 1937–1952 (for abstract, *see item* 4.7–31, July 1953, *MAB*). Other titles con-nuing its **Elementos** will be its **Observações Meteorológicas de Altitude em Angola** and **nuario Meteorológico do Observatorio J. Capêlo.** Contains monthly tables of daily ob-ervations or data for 14 first order stations, monthly and annual data for 91 second order tations and monthly total precipitation for 120 rainfall stations in Angola for the year 1953. urface data for the João Capêlo Central Observatory, at Luanda, is published in one part, nd upper air data in Part 2 of the present series. *Subject Headings:* **1. Annual meteorological eports 2. Climatic data summaries 3. Upper air data 4. Angola.**—*M.R.*

7.9–83 551.506.3:551.524(43)

Boer, W. and Lorenz, H., **Einige Bemerkungen zu klimatologischen Normalwerten der Monatsmitteltemperatur für den Zeitraum 1901 bis 1950.** [Some remarks on climatological normals of monthly mean temperature 1901–1950.] *Zeitschrift für Meteorologie*, Berlin, 10(1):1–11, Jan. **1956.** 7 figs., 4 tables, 12 refs. **DWB**—Discussion of normals for East Germany 1901–50 includes relative homogeneity and reduction of short periods. Local site peculiarities and the prevailing weather in the period of observation are important, as shown by differences from Potsdam in Oct. 1951. Causes of variations 1901–50 in differences between Potsdam, Dresden and Gorlitz, and the annual variation of temperature in 4 groups of stations, are examined. The temperature decrease with increasing height, the use of very short periods, and comparisons with other periods are also considered. *Subject Headings:* **1. Temperature normal calculation 2. East Germany.**—*C.E.P.B.*

7.9–84 551.506.5(99) 551.506.7(99)

*Australian National Antarctic Research Expeditions, **A.N.A.R.E. Reports, Series D, Vol. 5, Meteorology, Heard and Macquarie Islands, 1952.** Prepared by the Bureau of Meteorology, Melbourne, Antarctic Div., Dept. of External Affairs, Aug. **1955.** 173 p. numerous

tables. *Idem:* **Vol. 6, Heard and Macquarie Islands 1953.** pub. Aug. **1955.** 169 p. tab
DLC—Continuing the series begun in 1950 (for 1947 data) the 4th and 5th year of data
Heard and Macquarie Islands for the years 1952 and 1953 are published from punched c
summaries (*see item* 5A–67, Jan. 1954, *MAB*). The data presented in extensive freque
tables include normal surface synoptic data, plus upper air winds and temperatures, tropopa
heights, pressure and temperature. Frequencies of temperature, wind speed and directi
and maximum gust velocity, dew point depression versus temperature, pressure, precipitati
sunshine hours, and upper air temperature at standard levels are given for specified cl
intervals. Original observations are given for every 3 hours. *Subject Headings:* **1. C
servational data 2. Upper air temperature data 3. Upper air wind data 4. Tropopause d
5. Heard Islands 6. Macquarie Island. I. Australia. Dept. of External Affairs.**—*M.R.*

INSTRUMENT CARRIERS

See also: **Aircraft weather reconnaissance** (Cook Res. Lab.), 7.9–53; **Jet stream data** (Landers), **7.9–145.**

7.9–85 551.507.1:551.5

Burckhardt, Hans, **Ausrüstung, Aufgaben und Arbeitsweise des Messzuges Neusta** [Equipment, tasks, and methods of the Neustadt mobile observation station.] *Germa Deutscher Wetterdienst, Mitteilungen,* 2(14):134–147, **1955.** 10 figs., 6 refs. **DWB**—Wi the aid of numerous photographs the author describes in detail the truck, the instrumentati the installation of the instruments in the truck, the observational procedure for microclima studies, etc. Also the personnel setup, the organizational association of a mobile measuri unit with an agrometeorological network are considered. *Subject Headings:* **1. Mobile weath stations 2. Microclimatological research 3. Germany.**—*I.L.D.*

7.9–86 551.507.321.2:551.557

Neiburger, Morris and Angell, James K., **Meteorological applications of constant-pressu balloon trajectories.** *Journal of Meteorology,* Boston, 13(2):166–194, April **1956.** 26 figs 3 tables, 9 refs., 16 eqs. **DWB**—"The areal coverage to be expected from 300-millibar co stant-pressure balloons (CPB) is examined for various numbers of releases per day fro various stations. The meteorological variables which can be measured are discussed. Th accuracy of balloon fixes required for useful determinations of velocity and acceleration determined." Twice a day releases from 2 stations sufficiently separated in latitude woul cover middle latitudes of N. America fairly well. The pressure and wind field would b determined with good accuracy and with turbulence largely eliminated. "Together wit radiosonde and rawin data they enable determination of the vertical velocity, but measuremen of all the necessary parameters by CPB alone has not been achieved yet. There is presente an analysis of the geostrophic deviations computed from the trajectory data, including thei variation with latitude, wind speed, and pressure-gradient force." *Subject Headings:* **1. Upp air wind observation 2. Constant level balloons.**—*C.E.P.B., Authors' abstract.*

7.9–87 551.507.321.2

Venkateswarlu, V. and Gangal, Y. H. (*Met. Off., Poona*), **Rate of ascent of pilot balloons** *Indian Journal of Meteorology and Geophysics,* New Delhi, 6(4):363–366, Oct. **1955.** 2 figs. 2 tables, 2 refs. **DWB, DLC**—An analysis is presented of the rate of ascent of pilot balloon at Poona for a nine year period 1945–1953. A few selected height-time lines of Poona, with height values of every minute plotted for tailed ascents, are given and results of a comparison of the actual rates of ascent for all tailed balloons made in nine years with expected rates are presented in tables. *Subject Headings:* **1. Pilot balloon ascension rates 2. Poona, India.** —*I.L.D.*

7.9–88 551.507.321.4:551.501.7

Akita, I., **Apparatus for meteorological observations with a captive balloon, Pt. 1.** *Journa of Meteorological Research,* Tokyo, 7(8):484–489, Oct. **1955.** 3 figs., 3 tables, 3 refs., 5 eqs. In Japanese; English summary p. 484. **DWB**—Since May 1952 some serial observations o

ry and wet bulb temperatures, wind velocity and wind direction, up to the height of nearly 00 meters above the ground have been taken at Honjo, using thermistor sensitive elements ing over a captive streamline balloon. In this report an account is given of the instruments sed such as thermometer, anemometer, cable and recording apparatus. Errors of the temerature recording are discussed and estimated as: 1) amplifier—maximum 0.2°C, generally 1°C; 2) resistors of the bridge with temperature coefficient (-2.6×10^{-4}/°C)—maximum 2°C; 3) cable with temperature coefficient (3.14×10^{-3}/°C)—maximum 0.3°C; 4) Joule eat in the thermistor—about 0.1°C; 5) leakage in the wet air—not negligible. Synthetic ubber was found to be practicable for insulating the surface of wet-bulb thermometer. *Subject Headings:* **1. Upper air observation 2. Captive balloons 3. Recording equipment 4. Honjo, Japan.**—*Author's abstract.*

7.9–89 551.507.362

Jones, F. E. and Massey, H. S. W., **Rocket exploration of the upper atmosphere.** *Nature*, London, 177(4510):643–645, April 7, **1956.** 6 figs. **DWB**—The plan of a British rocket is described. The burning time of the fuel is to be 30 sec, weight 2500 lb, pay-load 150 lb. Velocity-time and height-time performance are shown. Height is estimated as 550,000 ft (later versions 700,000 ft). Initial firings will be at Woomera Range, Australia. It is planned to measure wind, temperature and pressure by the grenade method, also ionization, night airglow and solar radiations. *Subject Headings:* **1. Rockets 2. British rockets.**—*C.E.P.B.*

INSTRUMENTS

See also: **Humidity** (Penman), 7.9–7; **Aerological measurement** (Hinzpeter), 7.9–73; **Temp. distribution near cold surface** (Fleagle), 7.9–165.

7.9–90 551.508:551.584:681.1

Taylor, R. J. and Webb, E. K., **Mechanical computer for micrometeorological research.** *Australia. Commonwealth Scientific and Industrial Research Organization. Div. of Meteorological Physics, Technical Paper*, No. 6, **1955.** 16 p. 8 figs. (incl. photos), 4 tables, 5 refs., eqs. **DWB**—A description is given of a mechanical computer built, in the general form of a differential analyser, for computing the vertical turbulent fluxes of total heat, water vapour, and momentum, and certain other quantities from photographically recorded traces of the fine structure of wind variables, temperature, and humidity in the lowest layers of the atmosphere. The violently fluctuating nature of the data supplied to the analyser makes necessary particular care in both design and construction if sufficient accuracy is to be achieved. An analysis of accuracy indicates that errors as small as 1–2% can be achieved when the result represents a flux of reasonable magnitude and that they rarely exceed 5–10%. Very small fluxes may be subject to a greater proportional error. *Subject Headings:* **1. Micrometeorological instruments 2. Computing machines 3. Instrument accuracy.**—*Authors' abstract.*

7.9–91 551.508.2:535.245:581.54

Allan, A. H. and McCree, K. J. (*both, Dominion Physical Lab., New Zealand*), **Integrating meters for comparing light intensities in plant growth studies.** *Journal of Scientific Instruments*, London, 32(11):422–424, Nov. **1955.** 7 figs., 9 refs. **DWB**—Two instruments for measuring the light intensity in a plant cover as compared with that on the top of the cover, are described and the optical and physical characteristics (spectral sensitivities of photocells, angular sensitivity, etc); the construction, circuits, comparative merits of each instrument, fatigue and accuracy are discussed and illustrated. Instruments must be sensitive over a range from 0.40 to 0.72μ. *Subject Headings:* **1. Photometers 2. Light intensities in plant cover.**—*M.R.*

7.9–92 551.508.22

Dobosi, Zoltán, **Mikroklimatikus sugárzásmérések módja fehér-fekete gömbű inszolációs hőmérővel.** [Microclimatological radiation measurement by means of black-and-white insolation thermometers.] *Időjárás*, Budapest, 59(3):148–152, May/June **1955.** 2 figs., ref., eqs. Russian and French summaries p. 148. **DWB, DLC**—It is shown that black-and-

white-bulb insolation thermometers measure direct radiation like actinometers normal to rays. Diffuse sky radiation and radiation reflected from below will give double as large va on bulb thermometers as on horizontal actinometers. This fact has to be taken into consid tion in microclimatic measurement. Data obtained with flat surface actinometers and w bulb insolation thermometers may be mutually converted. *Subject Headings:* **1. Radian thermometers 2. Microclimatic radiation measurement.**—*Trans. of author's abstract.*

7.9–93 551.508.23:551.574

Moon, A. E., **The removal of frost and ice from sunshine spheres.** *Weather*, 11(5):1 May **1956. DWB**—Describes author's experiments. The most successful method was pour a teaspoonful of alcohol over the sphere *in situ*. *Subject Headings:* **1. Campbell-Sto sunshine recorder 2. Frost removal from instruments.**—*C.E.P.B.*

7.9–94 551.508.25:551.521

Hiltrop, E. and Grasnick, K.-H., **Aufbau eines Messgerätes zur Registrierung globa UV-Strahlung.** [Construction of an apparatus for recording UV-radiation.] *Zeitschrift Meteorologie*, Berlin, 9(11/12):366–368, Nov./Dec. **1955.** 4 figs., ref. **DWB**—The appara consists of a filter chamber with a 40 mm opening on top, UV filter, quartz chamber holdi $CuSO_4$ solution, selenium photo element and electrical auxiliaries. Working drawings a photos are shown. *Subject Heading:* **1. Ultraviolet recorders.**—*C.E.P.B.*

7.9–95 551.508.25:551.586.58:535.21:58

Schulze, L., **Ein Vorschlag zur Verbesserung und Vereinfachung der Lichtmesstechn bei okologischen Versuchen.** [A proposal for the improvement and simplification of lig measurement technique in ecological investigations.] *Archiv für Meteorologie, Geophysik u Bioklimatologie, Ser. B*, Vienna, 7(2):223–239, **1956.** 4 figs., table, 8 refs., 17 eqs. Germa English and French summaries p. 223–224. **DWB**—The possibilities and difficulties of lig measurements among plants (which do not respond to the same wavelengths as the eye) a discussed. For ecological purposes author proposes to use CO_2 assimilation as a basis; t is defined and the color of the light source expressed as a modification of the Young-Helmho 3-color theory. A theoretical method of determining assimilation light values and col coordinates is described with examples calculated for different light sources. Characteristi of 12 lamps are given and compared with those of sunlight. *Subject Headings:* **1. Light mea urement on plants 2. Plant illumination measurement.**—*C.E.P.B.*

7.9–96 551.508.29:621.3.0

Malmberg, Paul R. and Matland, Carl G. (*both, Westinghouse Research Lab., Pittsburgh*) **Thermistor temperature control.** *Review of Scientific Instruments*, Lancaster, Pa., 27(3):13 139, March **1956.** 6 figs., 4 refs. **DWB, DLC**—A temperature controller using small bea thermistors as temperature sensing elements has been developed. The controller has a over-all range of +20 to +300°C, or −60 to +190°C, using 51A2 or 32A12 thermistor respectively, in an ac bridge. Extension of the operating temperature range to other limi is possible using other sensing elements. Linear proportional action is achieved with powe relay output by comparing the amplified and rectified bridge signal with a stable and linea sawtooth wave form. This comparison controls the fractional "on" time of the power rela during a periodic "on-off" cycle. The controller offers stable control under all conditions unbalance, and is stable to 0.1°C or better over an eight-day period. *Subject Heading* **1. Temperature control 2. Thermistors.**—*Authors' abstract.*

7.9–97 551.508.7:551.576.11:551.574:551.577:551.558.

Murgatroyd, R. J., **Cloud physics at the Meteorological Research Flight.** *Archiv fü Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 8(3):246-264, **1955.** 10 figs., 16 refs English, German and French summaries p. 246–247. **DWB**—Aircraft instruments for clou physics include rapidly acting thermometers, hygrometers, hot-wire anemometers and aircra accelerometers, with hot-wire water content and icing meters for use in cloud. From th turbulent, slightly superadiabatic lowest 1000 ft below cumulus, bubbles 300–600 ft across ris sporadically to a dry-adiabatic environment. Just below cloud base, lapse rate is usuall

able. Within cloud, temperatures are difficult to measure. Water content distribution is own; it probably exceeds 5 g/m³ locally for short periods. Small cloud particles can be dily sampled from aircraft but not hail, snow or rain. Droplets >100μ diameter occur in mulus over England. Rain may be given by stratiform warm sector clouds below freezing el or large cumulus before icing stage is reached. In England rain may often fall from uds in which the Bergeron mechanism does not operate. *Subject Headings:* **1. Cloud ysics instruments 2. Cloud physics research 3. Great Britain. Meteorological Research ight.**—*C.E.P.B.*

7.9–98 551.508.71

Cutting, C. L.; Jason, A. C. and Wood, J. L., **A capacitance-resistance hygrometer.** *urnal of Scientific Instruments*, London, 32(11):425–431, Nov. 1955. 15 figs., 13 refs. **WB**—A robust, rapid response hygrometer consisting of a condenser having as a dielectric porous film of alumina proves to be very sensitive and easily adapted for continuous recording. he theory, construction, calibration, effects of water vapor on capacitance and resistance eing (after initial period of ageing, the calibration is stable); and reproducibility, influence temperature on capacitance and resistance (functions of relative humidity, not absolute, midity down to −15°C where a sharp change occurs before −30°C is reached, sensitive to lative humidity even from 100°C to 400°C); transient response, etc. The range of high nsitivity can be extended by modifying length of pores, or frequency. Sensitivity from 0° to)°C is ±2% relative humidity. Air speed has no effect on measurements, remote readings e possible. *Subject Headings:* **1. Capacitance-resistance hygrometers 2. Aluminum oxide ygrometers.**—*M.R.*

7.9–99 551.508.72:581.11

Pfeifer, Fritz, **Eine Schwimmwaage zur Registrierung der Transpiration.** [A floating alance for recording transpiration.] *Zeitschrift für Meteorologie*, Berlin, 10(1):22–28, Jan. 956. 4 figs., 27 refs. **DWB**—Describes a floating lysimeter for recording the least change the water use of plants. It is shown in diagram and photo; it consists of a 70 cm deep ater basin (oil covered to prevent evaporation) with a float supporting an earth-filled cylinder which the plants are growing, the lowest 10 cm of the cylinder being open to a supply of ater in the float. Transpiration causes the float to rise slowly (3–5 mm/day), the movement eing magnified 20–50 times on a drum. Examples of "transpirograms" are shown, including ne of gain of weight by dew. *Subject Heading:* **1. Evapotranspirometers.**—*C.E.P.B.*

7.9–100 551.508.72

Robertson, George W., **The measurement of latent evaporation using the central experimental farm plastic mount.** Ottawa, Canada, Division of Field Husbandry, Soils and Agricultural Engineering, Division of Illustration Stations, Central Experimental Farm, 1956. p. 3 figs., 2 tables. Mimeo. **GB-MO**—Latent evaporation is the maximum possible evaporation under given conditions. A suitable instrument, the black Bellani plate atmometer with rain shield, and its exposure and operation, are described. Tables give conversion of readings to latent evaporation. *Subject Heading:* **1. Evaporimeters.**—*C.E.P.B.*

SYNOPTIC ANALYSIS AND FORECASTING

See also: **Fog forecasting** (Zuerev), 7.9–6; **Nucleation of supercooled water** (Mason), 7.9–8; **Weather forecasting, flight planning, flight watch** (Cook Res. Lab.), 7.9–54; **Forecasting data of potato blight** (Bourke), 7.9–57; **Heating air to prevent spring frosts** (Damario, Pascale), 7.9–59; **Prognostic charts for rel. humidity** (Beers), 7.9–61; **Forest fire danger** (Nelson), 7.9–62; **Storm and tornadoes of March 3, 1955** (Lautzenheizer), 7.9–151; **Wind variation with time** (Clarkson), 7.9–185; **Precip., Japan** (Suzuki, Tomatsu), 7.9–202.

7.9–101 551.509.1

Grunenberg, Josef, **Wetternachrichtenverbreitung auf den Fernschreibkanälen des Deutschen Wetterdienstes.** [Weather broadcasting over teletype network of the German

Weather Service.] *Germany. Deutscher Wetterdienst, Mitteilungen*, No. 10:62–68, F
1955. 5 figs. **DWB**—A survey of the method of distribution of meteorological repo
broadcast daily through the channels of the German weather teletype network, is present
It shows how the various branches of the service have to be coordinated in order to secure
transmission of all the material. The number of transmitted messages, the operation time
the channels, the methods of selecting the transmitted messages and their distribution am
the channels are discussed. Tables and charts show various networks and organization
Western Europe. *Subject Headings:* **1. Teletype transmissions 2. Transmission of d
3. Meteorological networks 4. German Meteorological Service.**—*A.M.P.*

7.9–102 551.509.1:551.509
Ockenden, C. V., **Substitute for Airmet.** *Weather*, 11(5):169, May **1956. DWB**
Suggests that those interested can learn enough morse to take down the Dunstable GFA W
transmission which gives all reports and analyses necessary to construct weather maps. Clu
institutes and commercial undertakings could get ready-made charts with a MUFAX record
Subject Headings: **1. Amateur forecasting 2. Synoptic reports.**—*C.E.P.B.*

7.9–103 551.509.2:7
**History of weather movements, Northern Hemisphere sea level, 1899–1939. Techni
motion picture produced by Gerrit Daams.** *American Meteorological Society, Bullet*
35(2):90, Feb. **1954. DWB.** 16 mm reels (HM 16:64, six 400 ft reels, $230. HWM 16:2
2 1200 ft reels, $230, from Research Methods Company, 200 West 57th Street, N. Y. 19, N. Y.
A film that projects successive daily weather maps to give the effect of moving fronts
systems, shows historical developments on a hemispheric scale. The entire series of U.S.W.
Northern Hemisphere Historical Weather Maps is on the film, which runs at a rate of 3 yea
of maps in 7 minutes. *Subject Headings:* **1. Northern Hemisphere chart movies 2. Meteor
logical films 3. Northern Hemisphere. I. Daams, Gerrit.**—*M.R.*

7.9–104 551.509.31:551.515
Fujita, Tetsuya (*Kyushu Inst. of Tech.*), **Results of detailed synoptic studies of squa
lines.** *Tellus*, Stockholm, 7(4):405–436, Nov. **1955.** 48 figs., 17 refs., eqs. **DWB, DLC**
A system of synoptic analysis on a mesometeorological scale has been developed through th
combined use of space and time sections applied to all regular and special stations in an are
500 by 900 mi in the Central United States. Two periods of development of large thunde
storm areas are analyzed. In both of these periods tornadoes occurred. The synoptic mod
of a squall line in this scale involves three principal features of the pressure field: the pressu
surge, the thunderstorm high and the wake depression. Another feature, called the tornad
cyclone, accompanies tornado funnels. Divergence values of 10 to 60.10^{-5} sec^{-1} over area
of 100 to 10,000 sq mi are measured. The mesosynoptic disturbances greatly influence th
situation as viewed on the regular synoptic scale, which is about 10 times the meso-scale, an
make conventional analysis hopelessly difficult. *Subject Headings:* **1. Synoptic analysi
2. Squall lines 3. Tornadoes associated with squalls.**—*Author's abstract.*

7.9–105 551.509.311:551.515.8(74/75
§Shafer, R. J. and Funke, P. W., **Forecasting of widespread, prolonged post cold-fronta
weather.** Atlanta, Georgia, Eastern Air Lines, Inc., Jan. **1955.** 19 p. 8 figs., 2 refs. **DWB**
Under certain conditions, areas of widespread post cold-frontal weather hamper air lin
operations east of the Rocky Mountains for several days. A method of evaluating and fore
casting this type of situation 24–30 hrs in advance is possible by semi-subjective processes
It is required that a tightly packed thermal field at 850 mbs follow a surface cold front int
the eastern section of the United States. Decay of the contour field then leaves this therma
"ribbon" under calm or light southerly winds permitting warm air lifting for large areas ove
the frontal surface. Serious icing conditions usually follow as well as a wide band of lo
ceiling and snow. Rules for estimating the width as a function of the frontal orientation ar
given. The condition will persist until low level cold advection again moves the packe
thermal field out of the area. *Subject Headings:* **1. Cold front forecasting 2. Eastern Unite
States.**—*Authors' abstract.*

7.9–106 551.509.312

Aubert, Eugene J., **A multi-level baroclinic model applicable to numerical prediction.** *Journal of Meteorology*, Boston, 13(2):207–211, April 1956. 8 refs., 33 eqs. **DWB**—A system of differential equations of motion in a non-linear baroclinic model is developed. The equations are evolved suitable for numerical forecasting of the height and vertical motion of various pressure surfaces. *Subject Heading:* **1. Numerical forecasting.**—*C.E.P.B.*

7.9–107 551.509.312:551.524.7

Bodolai, Emma (Jakus), **A hőmérséklet számszerű előrejelzése Budapestre.** [Numerical forecasting of temperature for Budapest.] *Időjárás*, Budapest, 59(5):282–291, Sept./Oct. 1955. 2 figs., 12 tables, 2 refs., 18 eqs. Russian and French summaries p. 282. **DLC**—SPENSKII's method of upper-air temperature forecasting (1947) is reviewed. The method is based on a mathematical treatment of upper-air temperature changes, assuming geostrophic flow and using synoptic values of surface pressure and temperature, and upper-air temperature. The application of the formula is explained by an example involving an upper-air temperature forecast for Budapest (Feb. 17, 1955) based on synoptic data for Europe. *Subject Headings:* **1. Upper air temperature forecasting 2. Numerical forecasting 3. Budapest, Hungary.**—*G.T.*

7.9–108 551.509.312:551.515.1

Estoque, M. A., **A prediction model for cyclone development integrated by Fjørtoft's method.** *Journal of Meteorology*, Boston, 13(2):195–202, April 1956. 11 figs., 2 tables, 7 refs., 19 eqs. **DWB.** Also issued as: Chicago Univ. Dept. of Meteorology. Contract AF 19(604)-1293, Technical Report No. 6, August 1955. 19 p. 3 figs., 2 tables, 4 refs., 19 eqs.—A set of prediction equations based on a $2\frac{1}{2}$ dimensional model is derived. These equations are integrated graphically for ten cases of sea level cyclogenesis. The resulting forecasts for the 1000 mb surface indicate accuracies comparable to those of numerical forecasts using the three-level model. The study was based on 10 cases for the U. S., Nov.–April 1950–55. Initial forecast and verification charts are reproduced for cases 1 and 2. *Subject Headings:* **1. Numerical forecasting 2. Cyclone development 3. Fjørtoft's graphical method.**—*Author's abstract.*

7.9–109 551.509.312

§Pothecary, I. J. W. and Bushby, F. H., **Series of computed forecast charts and the movement of a depression, August 19–21, 1954.** *Meteorological Magazine*, London, 85(1007):133–142, May 1956. 6 figs., 4 refs. **DWB**—On Aug. 19, 1954, a depression became stationary over the North Sea, contrary to expectation by usual methods. Forecasts of 1000 and 500 mb charts were computed electronically at 12 hr intervals, Aug. 19–21, based on Sawyer-Bushby 7-parameter model, and successfully predicted the motion. Other forecasting methods are compared. *Subject Heading:* **1. Numerical forecasting.**—*C.E.P.B.*

7.9–110 551.509.312

Thompson, P. D. and Gates, W. Lawrence, **A test of numerical prediction methods based on the barotropic and two-parameter baroclinic models.** *Journal of Meteorology*, Boston, 13(2):127–141, April 1956. 14 figs., table, 12 refs., 27 eqs. **DWB**—A two-parameter baroclinic model for vertically integrated flow is derived under the assumption of an isogonal geostrophic wind shear, and constitutes a generalization of the theory of equivalent baroclinic flow. The computational procedures used to apply both this theory and that for purely barotropic flow to the production of numerical forecasts are described in detail, and this is followed by a brief summary of the results of an extensive series of numerical integrations of the equations of both the barotropic and thermotropic models. In all, a total of 120 24-hour forecasts were made every 12 hrs from a series of especially prepared maps throughout the entire month of Jan. 1953, the largest collection of numerical forecasts assembled to the present time. From a preliminary summary of the results supported by the discussion of several individual cases, it appears that the major characteristics of this series of numerical forecasts are: 1) the lack of a significant difference between the barotropic and thermotropic 500-mb forecasts, the correlation between the predicted and observed 24-hr 500-mb height changes being 0.74 in each case, 2) the marked effects of a number of purely mathematical errors or

errors of method, especially those introduced by the lateral boundary conditions and by use of the finite-difference approximation, and 3) an important effect of the Rocky Mount barrier on the forecasts. These results are interpreted as demonstrating the quasi-barotr of the atmosphere at midtropospheric levels when considered on a day-to-day basis ove monthly period. The 1000-mb forecasts computed from the baroclinic theory, while d playing an average correlation between predicted and observed 24-hr height changes of o 0.62, show considerable synoptic "skill," especially over the eastern United States. Th forecasts are felt to demonstrate conclusively the applicability of numerical prediction te niques to operational forecasting. Further research on the effects of both the physical a mathematical approximations of the methods of numerical prediction is suggested. *Sub Heading:* **1. Numerical forecasting techniques.**—*Authors' abstract.*

7.9–111 551.509.33:519.24

Grant, Alison M., **The application of correlation and regression to forecasting.** *Austra Bureau of Meteorology, Meteorological Study,* No. 7, Jan. **1956.** 14 p. 3 tables, 16 ref numerous eqs. Mimeo. **DWB**—The theory of multiple correlation R is set out. In pur empirical regression equations used for long range forecasts falsely high coefficients may due to sampling errors or systematic variations. The selection of factors is discussed; is the lower limit of a useful correlation. G. T. WALKER's formulas for Indian rainfall a used as illustrations. Owing to interrelations, 4 of the 6 factors used add only 0.07 to and could be omitted. Further, it is considered that "in the absence of a sound physic basis for relationships, the observed correlations do not prove or even render likely the existen of correlations of useful magnitude between past and future weather." Many relations showi apparent lag are due to persistence. Verification must be based on independent data wi sufficient variation. *Subject Headings:* **1. Long range forecasting 2. Correlation theo 3. Regression equations.**—*C.E.P.B.*

7.9–112 551.509.3

Kletter, L., **Praktische Erfahrungen mit einer neuen Methode zur Ausarbeitung mitte fristiger Wetterprognosen.** [Practical experiences with a new method of working out mediu range forecasts.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A,* Vienn 9(2):264–293, **1956.** 13 figs., 2 tables, 9 refs. German, English and French summari p. 264–265. **DWB**—In summer 1955 experimental 5-day forecasts were made at Vien using 5-day 850 mb N. Hemisphere charts, trend charts $(h_{-2}+2h_{-1}+5h_0+2N)/10$; N = norm topography, trend tendency charts, and zonal wind profiles. Correlation of trend char with actual was 0.84–0.99, of trend tendency (5-day forecast) 0.02–0.97. The weather of th summer at Vienna is then considered; 8 periods of disturbed or fine weather are discusse synoptically and the forecasts analyzed. The advantages of the progression kinemati trend-trend tendency are pointed out. *Subject Headings:* **1. Extended forecasting 2. Austri** —*C.E.P.B.*

7.9–113 551.509.33:681.

Namias, Jerome (*U.S.W.B., Wash., D. C.*), **On the possibility of long range weathe forecasting by high-speed computing methods. Remarks presented before the Nationa Science Foundation-University of California at Los Angeles Conference on the Significanc and the Possibilities of High-Speed Computing in Meteorology and Oceanography, May 13–15 1955, Los Angeles, Calif.** 7 p. 3 figs., 3 refs. Photo-offset. **DWB**—Since time-average pressure charts (first introduced by T. DE BORT at the end of the 19th Century) often show a much standard deviation from month to month as synoptic charts show from day to day numerical methods could be explored for doing the basic computations and analysis which go into the 5-day or longer predictions. Several ways in which the experience of the lon range forecasters can be placed at the disposal of the numerical prediction technicians ar outlined. Quasi-periodic phenomena or rhythms could be detected by machine. Spac variations in weather associated with predicted mean patterns could also be calculated o high speed computers. Vorticity components can also be treated numerically though it is no established that they would be completely valid for mean circulation pattern movement *Subject Heading:* **1. Numerical long range forecasting techniques.**—*M.R.*

7.9–114 551.509.33:551.524.36(547)

Raghavendra, V. K. [Met. Office, Poona]. Statistical study of maximum temperature at Poona with special reference to forecasting of weekly maximum temperature. *Indian Journal Meteorology and Geophys.*, Delhi 7(1):17–26, Jan 1956. 11 figs., 11 tables, 9 refs. DWB, C—Seventy-two years' maximum temperature data at Poona have been studied in this paper. The maximum of variability of mean monthly maximum temperatures have maxima in June and Oct. The frequency distribution of daily maximum temperature during April and May have been studied and found to be skew. The curve $dx/dx = kx^m (1-x)^n$ has been fitted to the frequency distribution. The inter-monthly correlations between the mean maximum temperatures have been found. The winter months are highly correlated. The inter-weekly correlations during the winter months have been calculated. The regression equations for forecasting of weekly maximum temperature for the week Nos. 46, 47, 48, 49, 50, 51, 1, 2 and 3 of the Gregorian year, based on the weekly maximum temperatures of the preceding four weeks, have been worked out and comparative diagrams are given. Also the frequency of spells of months with mean maximum temperature above and below the current-planning normal were worked out and the persistency of months of either type has been studied. *Subject Headings:* 1. Maximum temperature frequencies 2. Statistical forecasting 3. Poona, India.—*Author's abstract.*

7.9–115 551.509.5

Bazilin, N. I. and Murskii, G. N. Metod otsenki prognozov. [Method of evaluating forecasts.] *Meteorologiia i Gidrologiia*, Leningrad, No. 4:24–28, July/Aug. 1955. 8g., 2 tables, 4 refs., 15 eqs. DWB—The alternative method with a given tolerance of evaluating qualitatively the accuracy of a forecast is criticized. Instead, the author proposes a method of evaluation in which the value of the forecast would be a function of the forecast error. The formula developed for evaluating the forecast values is $F = e^{-\alpha\delta^2/\sigma^2}$ and its application is illustrated. *Subject Headings:* 1. Forecast errors 2. Forecast verification.—*I.L.D.*

7.9–116 551.509.51:551.575.5

Schwarz, W. An objective method for forecasting low stratus at Lod Airport in the absence of radiosonde data. *Israel Meteorological Service, Series C, Miscellaneous Papers*, No. 9, 1956. 12 p. 9 figs., 5 tables, 4 refs. Mimeo. DWB—Lod Airport lies in the east of the coastal plain, 15 km inland. Fog or low stratus is of the "inversion stratus" type; typical charts are shown. Various probability diagrams were tried out, the most useful being: temperature vs. dew point depression at Lod; Relative humidity, Lod vs. Jerusalem; Wind direction at 1000 ft vs. 5000 ft; Cloud type, Lod vs. Jerusalem. A combination of these 4 gave 84% correct forecasts, the errors being nearly all on the safe side. *Subject Headings:* 1. Fog forecasting 2. Israel.—*C.E.P.B.*

7.9–117 551.509.59:551.543

Gandin, L. S. and Sinel'nikova, K. K. O prognoze skorosti peremeshcheniia baricheskikh tsentrov. [Forecasting the velocity of movement of baric centers.] *Meteorologiia i Gidrologiia*, Moscow, No. 3:27–30, May/June 1955. 1 table, 2 refs., eqs. DWB—The author develops a quantitative method for forecasting the movement of pressure centers based upon the transformation of known extrapolation formulas and the results of verification of the proposed method and of other methods on the basis of extensive material. The formulas developed are:

$$Ve = \frac{B^2}{Pe - P} \cdot \frac{\partial pt}{\partial y} \quad \text{and} \quad Ve = -\frac{B^2}{P_1 - Pe} \cdot \frac{\partial pt}{\partial y}$$

The procedure for calculating the movement of pressure centers and that of verification are outlined and the forecasting is compared with the method of V. I. Bushuk. *Subject Heading:* 1. Pressure tendency forecasting.—*I.L.D.*

7.9–118 551.509.67

Davies, D. A. Artificial inducement of precipitation in the tropics. *East African Hill Meteorological Dept. Technical Memorandum*, No. 6, 1954. 11 p. 15 refs.

DWB—A review of theory and methods used (and brief evaluation of success of these methc to produce precipitation in the tropics by seeding with dry ice, AgI, hygroscopic substan and water. Experiments conducted in East Africa, Madagascar, Hawaii, India and Austra are considered significant, although results are not yet too definite. Further research, pecially on warm cloud seeding with water, is necessary. The balloon technique used East Africa needs further evaluation. *Subject Headings:* **1. Cloud seeding evaluation 2. Tr ical cloud seeding.**—*M.R.*

7.9–119

551.509.

Mason, Basil John and Hallett, J., **Artificial ice-forming nuclei.** *Nature*, Lond 177(4511):681–683, April 14, 1956. 2 figs., table, 9 refs. **DWB**—Silver iodide is an effect nucleating substance below −5°C. A number of other pure substances were tested by experimental procedure which is described, but mostly failed to produce ice crystals ab −40°C. Lead iodide was effective at −7°C and mercuric chloride at −25°C. The techniq used in silver iodide generators may not be the most efficient; AgI particles are reduced high temperatures and by ultraviolet radiation, and their ice-nucleating properties large inhibited. Lead iodide is more stable and may be a practicable substitute. *Subject Headin* **1. Cloud seeding techniques 2. Silver iodide 3. Lead iodide.**—*C.E.P.B.*

7.9–120

551.509.

Mason, B. J., **The physics of rain-making.** *Discovery*, Cambridge, 16:461–464, N **1955.** 4 figs., 3 refs. **DLC**—The mechanisms of precipitation release are described in sim language. Coalescence occurs because cloud droplets are of different sizes. Ice crystals gr more rapidly than supercooled water droplets between 0 and −20°C; most layer clouds whi produce rain have tops colder than −12°C. Drops in shower clouds increase by disruptio Structure of hail is explained. Artificial stimulation by dry ice from aircraft is effective b costly. Silver iodide smoke is of doubtful efficiency. Seeding warm clouds with salt powd is as effective as with water drops, and cheaper. *Subject Heading:* **1. Cloud seeding technique** —*C.E.P.B.*

7.9–121

551.509.67:551.579.

Moran, P. A. P., **Statistical design of an experiment to test the stimulation of rai** *Australian Journal of Physics*, Melbourne, 8(4):440–448, Dec. **1955.** 6 tables, 5 refs. **DLC**— The problem of analyzing statistically the results of a C.S.I.R.O. rainfall experiment over th catchment area of the Kiewa River is considered. It is shown that in order to obtain a sig nificant result with any reasonable supposed increase in the rainfall within a few years it necessary to use a control variable strongly correlated with the test variate. The powers various tests using either streamflow or rainfall as test variates are calculated when the contro variable is either streamflow in the Murray or rainfall in other areas. The general proble of designing such tests and the relationship between rainfall and streamflow are also considered *Subject Headings:* **1. Artificial precipitation 2. Cloud seeding evaluation 3. Rainfall stream flow relationships 4. Kiewa River Basin, Australia.**—*Author's abstract.*

STRUCTURE AND PHYSICS OF THE ATMOSPHERE

COMPOSITION OF THE ATMOSPHERE

7.9–122

551.510.4:546:3

Horsky, Zd. and Link, F. (*both Astrophys. Obs., Ondrejov*), **Calculs de la brillance de la couche de sodium.** [Calculation of the brightness of the sodium layer.] *Bulletin of the Astronomical Institutes of Czechoslovakia*, Prague, 4(6):162–165, **1953.** 5 figs., table, 9 refs. 13 eqs. Russian summary p. 165. **DLC**—The brightness of different models of sodiun layers is calculated and compared with the brightness of air. The relative intensity of the D line depends on solar zenith angle and model of the layer. Refraction is found to play a comparatively important part. *Subject Headings:* **1. Sodium layer brightness 2. Sodium D line.**—*Trans. of authors' abstract.*

7.9–123 551.510.41:551.577

*Egner, Hans (*Roy. Agric. Coll., Uppsala*) and Eriksson, Erik (*Met. Inst., Stockholm Univ.*), **rrent data on the chemical composition of air and precipitation.** *Tellus*, Stockholm, 7(1): 4–139, Feb. 1955. map, table, 4 refs. **DLC**—A network of air and precipitation sampling tions was established in Scandinavia (including Finland and Denmark) and in the United ngdom during the winter of 1954–5. Chemical composition of samples collected according specifications and sent to Uppsala each month (where analysis is made in the Royal Agri- tural College of Sweden) are given in 4 tables, listing the amount of precipitation and the Cl, NO_3-N, NH_3-N, Na, K, Mg, Ca, pH, HCO_3^- and conductivity values of precipitation; l the S, Cl, NH_3-N, Na, K, Mg and Ca composition of the air for Nov. and Dec. 1954 45 stations (except for some missing data). This will be a regular feature of **Tellus.** De- ls of equipment, analysis techniques, etc. are given. *Subject Headings:* **1. Chemical com- sition of atmosphere 2. Chemical composition of precipitation 3. Chemical climatology works 4. Northwest Europe.**—*M.R.*

7.9–124 551.510.41:551.510.534:551.521.61

Goody, R. M. and Roach, W. T., **Determination of the vertical distribution of ozone from ission spectra.** *Royal Meteorological Society, Quarterly Journal*, 82(352):217–221, April 56. 3 figs., 2 tables, 6 refs., 6 eqs. **DWB**—This note describes a method of finding the tical distribution of ozone by combining spectrographic mean pressure measurements the 9.6μ band (Walshaw and Goody: *Ibid.*, p. 177–186; *see* 7.9–127) with emission measure- nts. Epstein, Ostenberg and Adel (1955) have recently given details of a similar method. ere are many differences between the two, both in technique and interpretation, but the portant conclusion in each case is that valuable information can be obtained from this e of measurement. *Subject Heading:* **1. Ozone layer measurement.**—*Authors' abstract.*

7.9–125 551.510.41:546.246

*Petr, Tomislav, **Kysličník uhličitý v přízemní vrstvě atmosféry.** [Carbon dioxide in atmospheric layer near the ground.] *Meteorologické Zprávy*, Prague, 8(5):138–139, **1955.** ables. Russian and German summaries p. 138. **DWB**—In the Biometeorological Section the Institute for Hygiene at Prague atmospheric carbon dioxide measurements are being de as part of an air pollution program. Preliminary results of these measurements are esented in the form of four tables giving CO_2 values on four days (Jan. 31–April 10, 1955) every hour from 9 a.m. through 4 p.m., and corresponding temperature, wind speed and ection, and cloudiness values. Wind appears to be the most significant meteorological tor affecting atmospheric CO_2 content. *Subject Headings:* **1. Carbon dioxide near the ound 2. Prague, Czechoslovakia.**—*G.T.*

7.9–126 551.510.41:546.214

*Teichert, F. (*Wahnsdorft, Met. Obs.*), **Vergleichende Messung des Ozongehaltes der ft am Erdboden und in 80 m Hohe.** [Comparative measurement of ozone content of the at ground level and at a height of 80 m.] *Zeitschrift für Meteorologie*, Berlin, 9(1):21–27, 1. **1955.** 6 figs., 11 tables, 17 refs. **DWB, DLC**—Ozone measurements carried out at the ndenberg Observatory during Aug. 1953 and June Sept. 1954 at the ground surface and at eight of 80 m are discussed. Data on mean ozone values in γ ozone/cbm of air, hourly ans for June–July and for Sept. 1954; hourly values for a specific days daily means for June - y and Sept. 1954 are given in tables and the distribution of temperature and relative humid- for given days with ozone measurements are shown in graphs. *Subject Headings:* **1. Ozone asurements 2. Lindenberg Aerological Observatory.**—*I.L.D.*

7.9–127 551.510.41:551.510.534:551.521.61

Walshaw, C. D. and Goody, R. M., **An experimental investigation of the 9.6μ band of ne in the solar spectrum.** *Royal Meteorological Society, Quarterly Journal*, 82(352):177–5, April **1956.** 5 figs., table, 15 refs., eq. **DWB**—Strong's (1941) method of using the μ vibration-rotation band of ozone to measure the effective mean pressure of the ozone er was applied over 2 years at Cambridge, Eng. Experimental procedure is described.

The daily mean values of effective ozone height and ozone amount are plotted and dis... effect of water vapor and temperature is negligible. The mean height is 18–19 km (1... there is a seasonal variation with an annual range of 3.4 km and a minimum in summe... is attributed to greater convection at that season in the troposphere and lower strato... Short period variations are due almost entirely to random errors. *Subject Headings:* 1... **layer measurement 2. Ozone variations.**—*C.E.P.B.*

ATMOSPHERIC POLLUTION

See also: **Opacity of atmos.** (Fritz), 7.9–159; **Condensation nuclei in hygienic res.** (Effen... berger), 7.9–192.

7.9–128 551.

*Chamberlain, A. C., **Aspects of travel and deposition of aerosol and vapour ... *Harwell, England. Atomic Energy Research Establishment, HP/R* 1261, Sept. 17, 1953. ... 3 figs., 11 tables, 27 refs., 52 eqs. Photostat. **DWB**—Impaction and deposition la... spores and raindrops, both for flat horizontal or vertical surfaces and for collision wit... other (either drops falling through spores or spores blown through drops) are set fo... discussed together with experimental data. Washout of aerosols by rain, diffusion to a... surfaces, deposition of condensing vapors in grass or on a raindrop, washout of vapor by ... etc. are treated in Pt. I. Pt. II takes up dilution formula for ground level sources (Sut... equations) and modification of Sutton's equations to take account of washout by ... Finally, dilution formulas for elevated sources to take account of deposition and washo... rain are given. Numerous graphs of data as well as tally of results are included. R... active tracers were used. *Subject Headings:* **1. Aerosol deposition 2. Aerosol diff... 3. Vapor deposition 4. Terminal velocity of drops 5. Harwell, England.**—*M.R.*

7.9–129 551.510.42:551.

Pasquill, F., **Preliminary studies of the distribution of particles at medium range fr... ground level point source.** *Porton, England. Chemical Defence Experimental Establish... Porton Technical Paper*, No. 498, **1955.** 13 p. 9 plates, 2 tables, 4 refs. Mimeo. **GB-M...** Measurements of distribution of fluorescent particles (diameter 0.5–3μ) up to 40 mi ... zontally and 4000 ft vertically from a blower at Porton were made on 6 days, with sur... upper air and geostrophic winds. The "effective wind" agreed within 5° and 4 mph with... vector mean of the pilot balloon wind. There was little variation of direction or speed ... height. Cloud width subtended up to 40° at 5 miles and 20° at 40 miles. Three experim... were in anticyclonic conditions with overhead inversions, but the inversions did not pre... much obstacle to vertical spread. (For summary, *see* 7.3–211, March 1956, *M.A.B.*) *Su... Headings:* **1. Atmospheric pollution studies 2. Porton, England.**—*C.E.P.B.*

7.9–130 551.510.42:551.551:551.5

Priestley, C. H. B., **A working theory of the bent-over plume of hot gas.** *Royal Mete... logical Society, Quarterly Journal*, 82(352):165–176, April **1956.** 2 figs., 3 tables, 9 re... 16 eqs. **DWB**—An ascending plume of hot gas is initially diffused by the turbulence wh... is induced by its own motion and later, but before all upward motion and buoyancy are l... by the natural turbulence of the environment. A working solution is put forward for the f... phase in terms of a spreading coefficient c and for the second in terms of a mixing rate k, a... it is shown that the transition from one phase to the other should be quite well marked. P... posed laws for c and k as functions of wind speed lead to good agreement with Bosanque... measurements of plume heights downwind from factory chimneys. The theory extends ... conditions of thermal stratification. It shows that a final equilibrium level should alw... exist except when very light winds coincide with unstable stratification, and it indicates ... buoyancy and stratification factors appropriate for scaling down to wind-tunnel experimen... The relative roles of initial impetus and initial buoyancy are characterized by a modi... form of the Froude number. *Subject Heading:* **1. Smoke plumes.**—*Author's abstract.*

UPPER ATMOSPHERE IONOSPHERE

See also: **Ionosphere movement record analysis** (Bowen), 7.9–14; **Vertical ozone distribution** (Goody), Pasadena, 7.9–124; **9.6μ ozone band in solar spectrum** (Migeotte), Uccle, 7.9–127; **Ozone determination** (Migeotte), 7.9–128; **Movement of sporadic E ionization** (Harvey), 7.9–260; **Aurorae and sporadic-E echoes** (Knecht), 7.9–267; **Tropospheric variations** (Campen, Coley), 7.9–270.

9–131

[illegible] Recordings of the zodiacal light. [illegible] Observ., 113(3):129–139, Mar. 1955. 3 figs., 2 refs. DWB DLC—[illegible] photoelectric recordings of the zodiacal light in the form of brightness maps have been made on 14 nights from March, 1954, past May, 1954. Only white light and completely polarized and non-polarized components were used. The zodiacal light was measured by azimuthally mounted reflector of 60-cm aperture with a photocell at its focus. The instrument scanned the sky automatically in the region of the anti-solar light, while the values of brightness were recorded simultaneously on a map of the sky in equatorial coordinates. [illegible] allowed the immediate plotting of isophotes, the immediate appearance of anomalous features and a rapid transfer of the data to the ultimate permanent record. During the long period the zone of the zodiacal light shows a high degree of symmetry with respect to the ecliptic. No significant time variations of any of the measured components of the zodiacal light are detected. An empirical analytic expression is given for the intensity of the zodiacal light in a limited region of the sky. [Author's abstract.] 2 Zodiacal light — [illegible]

MECHANICS AND THERMODYNAMICS OF THE ATMOSPHERE

See also: **Long waves in baroclinic model atmos.** (Ritz), 7.9–141; **Jet stream dimin** (Schaefer), 7.9–146; **Heat budget of water column** (Stommel), 7.9–171; **Importance of vertical atmos. exchange** (Frankenberger), 7.9–188.

9–132

[illegible]me, W. Der Impulsaustausch in der oberen Troposphäre und der Nullstabilitätsfall. [illegible] impulse exchange in the upper troposphere and the *zero layer effect*. *Zeitschrift für [illegible]rologie*, Berlin, 10(1):12–22, Jan. 1956. 4 figs., 40 refs., 41 eqs. DWB—The upper-tropospheric [illegible]ments near a horizontal surface separating two layers of different, constant [illegible] are investigated under: 1) stationary conditions, 2) steady advance, and 3) general [illegible] [illegible]ion constant and velocity changing linearly with height. It is found that only the [illegible]al change of geostrophic component and austausch coefficient in the same [illegible] [illegible]ions, winds are deflected towards high (low) pressure. The center of gravity of these [illegible]tures from the geostrophic wind is in the region of greatest austausch coefficient. With [illegible]rease of geostrophic wind from troposphere to stratosphere winds at the tropopause are [illegible]ted towards the higher pressure. This "positive tropopause effect" resembles E. Palmén's [illegible] layer effect." [Subject headings:] 1. Tropopause-wind relationships 2. Dust layer — [illegible] *author's abstract.*

9–133

[illegible]Veagle, Robert G. (Wash. Univ.). Instability criteria and growth of barotropic disturbances [illegible]s, Stockholm, 7(2):168–176, May 1955. 3 figs., [illegible] refs. [illegible] [illegible]s. *Univ., Dept. of Meteorology and Climatology* [illegible] [1954]. DLC—[illegible]nstability criterion and the rate of growth of [illegible] [illegible]rm zonal flow is derived for a sloping stream surface. Both [illegible] [illegible]xplicit and simple function. Unstable disturbances are characterized by [illegible]rd the cold air and downward motion toward the warm air. The [illegible] [illegible]ce is eliminated and the growth equation is compared with the results [illegible] maximum rate of growth is small enough to indicate that numerical [illegible] [illegible]gment of baroclinic disturbances is practicable. Other [illegible] [illegible] in a baroclinic atmosphere allow a fair [illegible] [illegible] [illegible] spherical earth could be [illegible] [illegible] [illegible]

Headings: **1. Instability criteria 2. Baroclinic disturbances 3. Waves in the westerlie** *Author's abstract.*

7.9–134 551.511:5

Hawthorne, W. R., **The growth of secondary circulation in frictionless flow.** *Cambr Philosophical Society, Proceedings*, 51(4):737–743, Oct. **1955.** 9 refs., 25 eqs. **DWB**— appearance of a component of vorticity in the direction of flow materially alters the patt of flow of a fluid in three dimensions. Expressions are obtained for this secondary vorti in an inviscid compressible fluid flowing under the action of body forces. They are app to examples such as a liquid under gravity and gas flow behind a curved shock. In c pressible gas flow with varying temperature but constant stagnation pressure no second circulation appears. In a perfect gas atmosphere it is shown that secondary circulation appear because of non-adiabatic lapse rates as well as wind-speed gradients. It is also sh that in a liquid with a density gradient, gravitational effects can give rise to secondary vorti components. *Subject Headings:* **1. Fluid flow 2. Vorticity.**—*Author's abstract.*

7.9–135 551.511:53

Long, Robert R. (*Johns Hopkins Univ.*), **Continuous density gradients: (Some aspe of the flow of stratified fluids, Pt. 3).** *Tellus*, Stockholm, 7(3):341–357, Aug. **1955.** 15 i (incl. photos), 8 refs., 35 eqs. **DLC**—The investigations of Pts. I and II (*see* 6.10–44, C 1955, *MAB*) are extended to include experiments and theoretical considerations relating to behavior of fluid systems with continuous gradients of density. The general equation steady-state motion derived in Part I is integrated to yield the flow of a stratified fluid over obstacle of finite dimensions. The results indicate a more or less complicated laminar w motion for obstacles of maximum height below a certain value. Larger barriers cause overdevelopment of the waves to a point where closed circulations and negative horizon velocities appear. It is shown that this is accompanied by locally unstable distributions density and eventual turbulence. If the height of the barrier is further increased, the veloc increases indefinitely in some parts of the field, becoming infinite for an obstacle of a cert size. No steady-state solution exists for larger barriers. The two critical values of the obsta height depend primarily on the Froude number: If this number exceeds $1/\pi$ the solution exi and is stable for all obstacles; for small Froude numbers the barrier must be small if the solut is to exist or be stable. If the obstacle is small enough to permit laminar or moderat turbulent motion, the accompanying experiments verify all important features of the the with remarkable fidelity. Larger obstacles cause considerable turbulence and blocking effe which propagate upstream, causing alternate maxima (jets) and minima of horizontal veloc in the vertical. *Subject Headings:* **1. Fluid dynamics 2. Stratified fluid flow.**—*Autho abstract.*

7.9–136 551.511:551.513

Palmen, E. (*Helsingfors*), **On the meridional transport of angular momentum due large-scale atmospheric eddies and meridional circulations.** *I.U.G.G. Association of Mete ology, Brussels, 1951, Procès-Verbaux des Séances. Mémoires et Discussion*, p. 32–34. pu Brussels, Dec. **1953.** 2 eqs. **DWB**—Divides the total meridional transport of angu momentum into a part due to variations in the Coriolis factor and a part due to meridio components, which can be separated into a mean component across the latitude and loc deviations. The zonal and meridional components must be positively correlated. *Subj Headings:* **1. Angular momentum flux 2. Large scale eddies 3. General circulation.**—*A*

7.9–137 551.511:551.551:551.5

Schmitz, H. P. (*Inst. of Phys. Hydrog., Ger. Acad. of Sci., Berlin*), **Das Gleichungssyste für den Vertikalaustausch von Wasserdampf und Warmeinhalt.** [System of equations f vertical exchange of water vapor and heat content.] *Zeitschrift für Meteorologie*, Berli 8(11/12):352–369, Nov./Dec. **1954.** 2 tables, 30 refs., 89 eqs. German summary p. 35 **DWB**—Using DALTON's law, the equation of state for ideal gases and the equations defini potential temperature θ and specific humidity α for known exchange coefficients, the auth obtains for θ and α six equations for determining humid air, seven correlation coefficien

tween the vertical, additional velocities and the turbulent deviation of the seven magnitudes state from their mean time value. The condition of continuity at the surface of the earth ovides a seventh equation for $z=0$ whereby the system becomes complete. Above the th's surface ($Z>0$) a differential equation can be used for the mass transport resulting m turbulence; for its integration, all conditions of state magnitudes up to Z must be known addition to the exchange coefficient. A critique of Wilhelm Schmidt's formula for deter- ning the turbulent mass transport is presented. *Subject Headings:* **1. Exchange coefficients Energy equations 3. Vertical energy exchange 4. Turbulent transfer of heat 5. Turbulent nsfer of water vapor.**—*I.L.D.*

7.9–138 551.511:551.576.1

Scorer, R. S. and Ronne, C., **Experiments with convection bubbles.** *Weather*, 11(5):150–4, May 1956. 7 figs., 4 refs. **DWB** —The bubble theory of cumulus towers is described. investigate factors controlling erosion, "bubbles" of liquid made heavier by solid particles re released into the surface of a tank of water. Photos are given showing results in water uniform density (no wake, mixing, vortex ring) and in stably stratified water. These are plied to convection in the atmosphere. *Subject Headings:* **1. Convection theory 2. Cumulus oud structure.**—*C.E.P.B.*

7.9–139 551.511 536.22

Takano, Kenzo (*Geophysical Inst. Tokyo U.*), **Example of thermal convective current.** *ecords of Oceanographic Works in Japan*, Tokyo, N.S., 2(1):76–79, March **1955.** table, ., 2 refs. Also his: **Sur la dimension des tourbillons cellulaires dans les éxperiences de enri Bénard.** [Dimension of cellular turbulence according to the experiments of Henri nard.] *Ibid.*, p. 80–86. 3 tables, 6 refs., 29 eqs. Also his: **Sur les tourbillons thermo- nvectifs dans la nappe fluide horizontale chauffée par en dessous.** [Thermoconvective bulence in the fluid horizontal layer heated from below.] *Ibid.*, p. 87–92. 4 tables, 4 refs., eqs. Also his: **Sur la différence critique de température dans les expériences de Douchan rsec au sujet des courants thermoconvectifs.** [Critical difference of temperature in Douchan rsec's experiments on the subject of thermoconvective currents.] *Ibid.*, p. 93–96. fig., ble, 3 refs., 15 eqs. Also his: **Sur les courants thermoconvectifs dans la nappe fluide hori- ntale chauffée par en dessous.** [Thermoconvective currents in the horizontal fluid layer ated from below.] *Ibid.*, p. 97–105. fig., 8 tables, 9 refs., 16 eqs. **DWB**—On the assump- n that the vertical distribution of the temperature is approximately linear and there is no riation in the Coriolis force, an example of thermal circulation due to temperature differ- ces at the surface in a rectangular canal of water is presented in the first paper. In the ond paper the dimensions of the thermo-convective cell in a layer of water heated from below e determined to be very near those obtained by BÉNARD, whether the calculations were sed on the time of cessation of motion or of commencement of fluid motion ($r=1.87$ to 2.27); and in the third paper a mean r of 2.02 was calculated (BÉNARD obtained $r=2.06$). the fourth paper it is shown that the values obtained by D. AVSEC (1938) on the thickness of air layer and the critical temperature difference cannot be explained unless the upper rface of ice is considered to be a non-conductor, and not a perfect conductor as has been sumed heretofore. The fifth paper continues this study by using experimental data of . V. R. MALKUS (1954) on the relation between critical temperature difference in a layer air heated below when the limiting surfaces are considered (a) both conducting, (b) upper n-conducting, and (c) both non-conducting. *Subject Headings:* **1. Convection theory Convective cells in water.**—*M.R.*

GENERAL CIRCULATION

See also: **Meridional transport of angular momentum** (Palmen), 7.9–136.

7.9–140 551.513:551.553.21

†Bohme, W., **Über thermisch bedingte Zirkulationen mit jährlicher Periode. (Beiträge n Monsunproblem I.)** [Thermally produced circulations with an annual period: con- butions to monsoon problems, Pt. 1.] *Zeitschrift für Meteorologie*, Berlin, 9(11/12):326–345,

Nov./Dec. **1955.** fig., 5 tables, 66 refs., 9 eqs. **DWB**—Earlier theories of the monsoon a summarized. Solutions to differential equations of atmospheric processes, set out in *Zeits für Met.*, 8:52–66, **1954** (*see* 6.1–123, Jan. 1955, *MAB*), are applied to the case of perio annual heating of the base of the atmosphere. The circulation scheme is more complex th earlier ones, involving 4 superposed layers. The results both of an exact and an approxima solution agree with observations in Eurasia, North America and Australia, which are discuss in detail. *Subject Heading:* **1. Monsoon circulation theory.**—*C.E.P.B.*

7.9–141 551.513.1:551.515:53

Kao, Shih-Kung (*Johns Hopkins Univ.*), **Wave motion in a rotating Couette flow of viscous fluid.** *Tellus*, Stockholm, 7(3):372–380, Aug. **1955.** 2 figs., 2 refs., 29 eqs. **DL** Also issued as: Johns Hopkins Univ. Dept. of Civil Engineering, Contract AF 19(604)-9 Scientific Report, No. 1, Dec. **1954.** 22 p. 2 figs., 2 refs., 28 eqs. **DWB**—With the assum tion of nondivergence horizontal flow, a certain class of solutions of the nonlinear hyd dynamic equations are obtained for a viscous Couette flow on an earth whose variation Coriolis parameter with latitude is constant. These solutions yield waves of transient typ of which the amplitude, wave velocity, and the inclination of the trough and ridge lines va with time. For Couette flow with both lateral and vertical velocity-shears, the vertical pro of the amplitude of the waves can either be exponential in z or independent of z, whereas f Couette flow with lateral velocity-shear only it permits to be independent of z, a sinusoid function, or a hyperbolic sine or cosine of z. These waves will eventually disappear in Couette flow regardless whether the fluid is viscous or not, although under certain conditio waves may be amplified within a certain time interval. Pressure field, geostrophic deviatio meridional transports of energy and westerly momentum are obtained for such a flow syste For reasonable values of the constants for atmospheric systems, geostrophic deviation c be as high as one order magnitude smaller than the actual wind speed. (For Contract repo *see* 6.11–200, Nov. 1955, MAB.) *Subject Headings:* **1. Couette flow 2. Waves in the wes erlies.**—*Author's abstract.*

7.9–142 551.513.1:681.

Phillips, Norman A., **The general circulation of the atmosphere: a numerical experimen** *Royal Meteorological Society, Quarterly Journal*, 82(352):123–164, April **1956.** 14 figs., tables, 62 refs., 72 eqs. Also review in *Nature*, London, 178(4525):129, July 21, **1956. DW** —Present knowledge of the atmospheric circulation is summarized. A 2-level geostroph model is set up and equations of motion, viscosity, etc., including friction and non-adiaba effects, are derived. Then starting from an atmosphere at rest, the development of t circulation is calculated with an electronic computer and continued for 31 days at interva of 1 day. Charts are given (without geographical reference; surface features are ignore showing calculated 1000 mb contours and 500 mb temperatures at 3 day intervals (days 11–2 The flow patterns developed include a jet, zonal surface westerlies and a large disturbanc In addition, the variation with latitude and time of mean meridional and zonal velocity a 500 mb temperature are plotted and momentum and energy budgets and changes tabulate An appendix sets out the numerical forecasting procedure. *Subject Heading:* **1. Atmospher circulation calculations.**—*C.E.P.B.*

7.9–143 551.513.1:551.5

Riis, Eyvind, **A discussion of long waves in a baroclinic model atmosphere.** *Nors Videnskaps-Akademi i Oslo. Institutt for Vaer- og Klimaforskning, Report*, No. 4, 195 11 p. fig., 3 refs., numerous eqs. **DWB**—In the paper an attempt is made to take in consideration terms which are usually neglected as unimportant in trying to find stabili criteria for long waves in the atmosphere. These terms will give rise to singularities in t differential equation for the vertical velocity w (or for the other dependent variables) quite another character than met with when neglecting the terms (Sec. 2). The equati will be more difficult to discuss, but the effect of these singularities can perhaps have an e sential influence on the stability criteria. In Sec. 3, it is shown that extremely long waves a stability waves in a statically indifferent atmosphere. In Sec. 5, we show that there a

olutions with singularities which for all wave-lengths are exponentially increasing with time. *ubject Headings:* **1. Baroclinic models 2. Long wave stability.**—*Author's abstract.*

7.9–144 551.513.2:551.557:551.558

Endlich, R. M.; Solot, S. B. and Thur, H. A. (*all, U. S. A. F. Cambridge Research Center*), **he mean vertical structure of the jet stream.** *Tellus*, Stockholm, 7(3):308–313, Aug. **1955.** figs., 5 refs. **DLC**—Mean vertical wind profiles were derived from observed wind soundings jet stream regions using the "peak wind" as a reference level. These profiles show the eatest shears immediately above and below the level of the peak wind. Relationships were und between the average height of the peak wind and the heights of three characteristic opopause types. A mean synoptic model of a jet stream having marked ageostrophic haracteristics is presented. *Subject Headings:* **1. Jet stream structure 2. Vertical wind ofiles.**—*Authors' abstract.*

7.9–145 551.513.2:551.557:551.507.352

Landers, Holbrook (*U.S.A.F. Cambridge Research Center*), **Analysis of some "project t stream" data.** *American Meteorological Society, Bulletin*, 36(8):371–378, Oct. **1955.** figs., 3 tables, 7 refs. **DWB**—Wind and temperature observations made by a specially quipped B-29 aircraft are compared with the conventional upper wind and temperature bservations. Analyses of the two sets of data are compared in vertical and horizontal planes, nd some wind field derivatives are compared and discussed. In one case strong vorticity elds of opposite sign are found to occupy the same region when computations are made from he two different sets of data. Two corrections to the wind speeds measured by pibal and win methods are discussed and applied to the data. These are the correction for the earth's rvature and a correction of the opposite sign which is caused by the graphical method of king two minute averages. It is suggested that perhaps the latter correction is large enough low speeds to warrant applying it to upper wind data. *Subject Headings:* **1. Jet stream nalysis 2. Airplane weather reconnaissance.**—*Author's abstract.*

7.9–146 551.513.2:551.557:551.576.12 551.513.2:551.511

Schaefer, Vincent J. (*Munitalp Foundation, Inc.*), and Hubert, William E. (*Univ. of tockholm*), **A case study of jet stream clouds.** *Tellus*, Stockholm, 7(3):301–307, Aug. **1955.** figs. (incl. photos in color), 10 refs., 4 eqs. **DLC**—The authors summarize the various ability criteria dealing with horizontal cyclonic, horizontal anticyclonic and vertical wind hear giving PALMEN's equation for the vertical component of the absolute vorticity in a onal current, the equation of ARAKAWA for critical cyclonic shear in zonal flow and the quation for determining Richardson's number, and review attempts to apply these criteria to xplain "turbulent motion" cloud types observed in connection with the jet stream. The case jet stream clouds display of March 1–3, 1953, over Schenectady, N. Y. is described with he aid of photographs. A vertical cross section from Goose Bay, Labrador, to Miami, Fla. at 500 cgt with cross section at Schenectady and vorticity analysis in vicinity of polar jet front re presented. *Subject Headings:* **1. Jet stream stability 2. Jet stream clouds 3. Jet stream orticity.**—*I.L.D.*

ATMOSPHERIC DISTURBANCES

See also: **Synoptic studies of squall lines** (Fujita), 7.9–104; **Prolonged post cold-frontal weather** (Shafer, Funke), 7.9–105; **Cyclone development prediction** (Estoque), 7.9–108; **Growth of baroclinic disturbances** (Fleagle), 7.9–133; **Wave motion in rotating Couette flow** (Kao), 7.9–141; special bibliography on **Tropical Cyclones, Hurricanes and Typhoons,** p. 1115.

7.9–147 551.515:551.577.37:551.579.4(945)

§Rainbird, A. F. (*Weather Bur., Sydney*), **Storm of October 20–21, 1953, Victoria.** *Australian Meteorological Magazine*, Melbourne, No. 8:1–20, March **1955.** 9 figs., ref. **DWB**—he formation and development of the storms of Oct. 20–21, 1953 which occurred in Victoria

and caused flooding of streams in the East Central and West Gippsland districts is investigat
The surface synoptic situation for Oct. 18–22, 1953 is described and the rainfall distribut
during the storm period is analyzed. The theoretical maximum rainfall possible from t
storms is determined by the methods developed by the U. S. Hydrometeorological Serv
Also the actual temperature and moisture structure of the air mass is determined and a c
parison between values of Vz obtained from the moisture distribution and that in the theore
saturated air mass is made. *Subject Headings:* **1. Rainstorms 2. Floods 3. Victoria, A
tralia.**—*I.L.D.*

7.9–148 551.515.1

Aota, T., **On the development of the cyclone of May 9–10, 1954.** *Journal of Met
logical Research*, Tokyo, 7(9):523–528, Oct. 1955. 8 figs., table, 3 refs. In Japanese; En
summary p. 523. **DWB, DLC.** Also issued as: *Sendai, Japan. Central Meteorolo
Observatory, Bulletin of the Meteorological Society for Research of Tohoku District*, 9(1):
Nov. 1955. In Japanese; English summary p. 1.—An unusually strong cyclone passed
the Japan Sea and Hokkaido on May 9–10, 1954, which caused various disasters (collaps
houses, damage to cultivated plants and accidents to fishing boats) in Tohoku District
Hokkaido. Investigations are made on the process and mechanism of the developmen
this cyclone, and the results are as follows: The abnormal development of the cyclone is fi
to be due to conditions in the upper troposphere that were favorable to cyclonic developm
and moreover this development was reinforced in its primary stage by strong air curre
from the south and in its final stage by southward intrusion of cold air. If either of the effe
of warm and cold air masses advection has been excluded, such an abnormal developm
could not have occurred. However, if the development by the southward intrusion of c
air had occurred after the passage of the cyclone to the areas of the Kurile Islands, a devel
ment of this intensity would not be without precedent. *Subject Headings:* **1. Cyclone
velopment 2. Tohoku District, Japan 3. Hokkaido, Japan.**—*Author's abstract.*

7.9–149 551.515.1:551.515.3/4(

Bhalotra, Y. P. R. (*Delhi Airport*), **Upper level thermal troughs and lows in the devel
ment of duststorms and thunderstorms over north-west India and western Pakistan.** *Curr
Science*, Bangalore, 24(7):226–227, July 1955. 6 foot-refs. **DLC, DWB**—A preliminary n
on study made for two May months. The thermal pattern (700–500 mb) seems to be m
associated with dust- and thunderstorms than the low level synoptic situation. Incursion
moisture in lower level is necessary. *Subject Headings:* **1. Upper level troughs 2. Du
storms 3. Thunderstorms 4. India.**—*M.R.*

7.9–150 551.515.1:551.5

§Conover, John H., **Spiral precipitation patterns in extratropical cyclones.** Blue H
Meteorological Observatory, Contract AF 19(604)-950, Meteorological Radar Studies, No.
Nov. 30, 1955. 11 p. 9 figs. (incl. photos), ref. **DWB**—The radar observations of spi
precipitation bands in extratropical cyclones fill the gap between the small scale visua
observed bands or streets composed of cumulus clouds and the large, intense radar precipitati
spirals observed in hurricanes. Reasonably accurate positions of the circulation center c
be determined by using the center of curvature of the innermost circles, areas, or spir
when the entire circulation is visible. *Subject Headings:* **1. Spiral precipitation patter
2. Extratropical cyclones 3. Radar observation.**—*Author's abstract.*

7.9–151 551.515.3:551.509.52(7

Lautzenheizer, R. E. (*WBO, Chicago*), **Storm and tornadoes of March 3, 1955.** Al
Beebe, Robert G. (*SELS Center, WBAS, Kansas City, Mo.*), **Tornadoes of March 14, 19
Monthly Weather Review, Wash., D. C., 83(4):94, 98–99, April 1955. **DWB**—Detailed ey
witness accounts of tornado of March 3, 1955, and hail storms which began in the southe
Chicago area and crossed Gary and vicinity and did one and a quarter million dollars dama
to property and livestock but with no fatalities (9 or 10 people injured). Hail ¼ to ½″ f

nost areas and some were 2" in diameter. Funnels were seen but wind damage was not usual. Pressure jumps and unusual purple, orange or green clouds were observed. The nadoes of March 14, 1955 are similarly described. They occurred in the Cameron and elsior Springs, Mo., area. More damage was done by wind in these tornadoes. Severe l storm forecasts had been issued at 1210 CST for 1400–2200 CST. The storms occurred 1700–1800 CST. *Subject Headings:* **1. Tornado damage, United States (March 1955) Tornado warning forecasts 3. United States.**—*M.R.*

7.9–152 551.515.3(782)

Van Tassel, Edgar L. (*Weather Bureau Airport Station, Scottbluff, Nebr.*), **North Platte ley tornado outbreak of June 27, 1955.** *Monthly Weather Review*, Wash., D. C., 83(11):255–, Nov. 1955. 12 figs. (incl. photos). **DWB, DLC**—The largest and most devastating nado in the history of western Nebraska occurred on June 27, 1955, in the North Platte ley. The storm path and damage are described and two personal accounts of encounters h the center are presented. Selected pictures from a large collection of photographs are roduced and used to determine the width and height of the funnel and of other features. lar pictures show the characteristic "hook" or "number 6" appearance of the associated id. Aerial photographs of unusual markings apparently made by the tornado on a field r Scottsbluff are scaled and used with certain assumptions to obtain an estimated surface d of 484 mph in the funnel. Information is given on observed downdrafts, sense of wind ation, shape of the cloud protuberance, and associated weather conditions. *Subject Heads:* **1. Tornado observation 2. Tornado tracks 3. Tornado photographs 4. North Platte ley, Nebr.**—*Author's abstract.*

7.9–153 551.515.73(262)

Rosenthal, Stanley L. and Gleeson, Thomas A., **Sea-level anticyclogenesis affecting diterranean weather.** *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, nna, 9(2):191–196, 1956. 7 figs., table, 2 refs. English, German and French summaries 191. **DWB**—Frequency of anticyclogenesis in each month 1928–37 in 30–70°N, 20°W–E is tabulated and plotted by months and latitudes. Charts show average bi-monthly quencies. *Subject Headings:* **1. Anticyclogenesis frequency 2. Mediterranean.**—*C.E.P.B.*

7.9–154 551.515.8:551.515.3/4:551.524.35(545)

Bhalotra, Y. P. R. (*Met. Office, New Delhi*), **On the role of upper level advection of cold in the development of duststorms and thunderstorms over Delhi.** *Indian Journal of eorology and Geophysics*, Delhi, 6(1):81–82, Jan. 1955. table, 5 refs. **DWB, DLC**—s study is based upon radiosonde temperature data for an eight-year period obtained when nderstorms and duststorms accompanied by squalls passed over Delhi. To determine the urrence of advections, temperatures at 700–500 mb either on the day of squall or on the vious day and the latest upper air temperature at the same levels prior to the passage of squall are compared. It was found that processes other than advections of cold air at er levels are responsible to a greater degree for the development of thunderstorms and tstorms over Delhi. *Subject Headings:* **1. Advective temperature change 2. Dust storms hunderstorms 4. Delhi, India.**—*I.L.D.*

7.9–155 551.515.8:616.926

John, H., **Über die meteorotrope Abhängigkeit der Poliomyelitis im Gebiet der Ober-sitz region.**] [The meteorotropic dependence of poliomyelitis in the Oberlausitz re-n.] *Archiv für Meteorologie, Geophysik und Bioklimatologie Ser. B*, Vienna, 7(2):-285, 1956. 4 figs., 3 tables, 26 refs. German, English and French summaries 77–278. **DWB**—Previous investigations into relation between poliomyelitis and passage fronts are summarized showing diversity of results. Author found that at Oberlaustitz, 3–1950, beginning of illness is closely related to the passage of cold fronts, whereas warm ts were probably ineffective. No relation was found between onset of paralysis and any ther phenomena. *Subject Headings:* **1. Frontal passage effects 2. Poliomyelitis.**—*P.B.*

RADIATION AND TEMPERATURE

RADIATION

See also: **Utilization of solar energy** (Bleksley), 7.9–64; **Computing global radiation** (Albrecht), 7.9–69; **Mie scattering coeff.** (Penndorf), 7.9–70; **Microclimat. radiation measurement** (Dobosi), 7.9–92; **UV-radiation recorder** (Hiltrop, Grasnik), 7.9–94; **Vertical ozone distribution** (Goody, Roach), 7.9–124; **Causes for semi-annual pressure oscillation** (Schwerdtfeger), 7.9–175.

7.9–156 551.521.1:551.5

*†Black, J. N., **The distribution of solar radiation over the earth's surface.** *Archiv f Meteorologie, Geophysik und Bioklimatologie, Ser. B*, Vienna, 7(2):165–189, **1956.** 14 fig table, 45 refs., 3 eqs. English, German and French summaries p. 165–166. **DWB**—Recor of total (sun+sky) solar radiation Q on a horizontal surface are available for 88 statio mainly in N. America and Europe. From these and SHAW's maps of mean cloud amount the relation $Q=Q_A(0.803-0.340C-0.458C^2)$ is found, Q_A being the radiation at the limit the atmosphere. Values of Q were calculated for each 5° latitude and longitude and wor maps drawn for each month. Agreement of estimated with recorded radiation is good most stations. *Subject Heading:* **1. Solar radiation distribution.**—*C.E.P.B.*

7.9–157 551.521

Thams, J. C., **Die Globalstrahlung eines Südhanges von 25° Neigung.** [Global radiati on a south slope of 25°.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser.* Vienna, 7(2):190–196, **1956.** 3 figs., 2 tables, 8 refs. German, English and French sum maries p. 190. **DWB**—The total radiation (sun+sky) at Locarno-Monti was recorded with Robitzsch actinograph sloped 25° to S and compared with that on a horizontal surface. C cloudless days the radiation recorded by the sloped actinograph was the greater by amoun ranging from 110% in Dec. to 10% in June and July. On all days the figures were 103% Dec. and 11% in June. *Subject Headings:* **1. Global radiation on slopes 2. Locarno-Mon Switzerland.**—*C.E.P.B.*

7.9–158 551.521.1:621.

Trombe, Félix, **Le grand four solaire de Mont-Louis.** [The great solar furnace of Mon Louis.] *L'Astronomie*, Paris, 69:45–60, Feb. **1955.** figs. (Nos. 23-32). **DWB**—A 60 75 k solar power plant has been developed and tested at Mont-Louis in the Eastern Pyrenee The equipment was first installed at Meudon Observatory (1946–49). At 6000°K a blackbo radiates energy at a rate of 8 Kw/sq cm, at 5000° about 4 Kw and at 4000°>2 Kw. At 1000 above sea level solar radiation can be received at .1 W/sq cm or 1 kw/sq m and by focusin with a mirror or parabolic reflector 2 m in diameter about 700-750 W/sq m, and temperatur of 3500°K on charcoal and >3300°K on some oxides (e.g., thorium oxide, which fuses 3000°K) are obtained. Equipment (6 m focal distance) is described in detail and illustrate It is thought possible to construct 1000 Kw units on the same principle, using longer foc length, less curvature on reflection and hence more precision. Orientation presents a ma problem. *Subject Headings:* **1. Solar furnaces 2. Mont-Louis, France.**—*M.R.*

7.9–159 551.521.12:551.510.42:551.2

Fritz, S., **Opacity of the atmosphere after July 1953.** *Meteorological Magazine*, Londo 85(1006):110–112, April **1956.** fig., 2 refs. **DWB**—Extensive turbidity of the atmosphe on July 26, 1953, was attributed to an Alaskan eruption on July 9. Departures of monthl averages of solar radiation from normal are shown for Table Mountain (Calif.), Blue Hill an Lincoln, all 3 were markedly deficient from Sept. 1953 through March 1954. *Subject Heading* **1. Solar radiation variations 2. Volcanic dust.**—*C.E.P.B.*

7.9–160 551.521.12:551.510.53

Héjjas, A., **Ozonbestimmung aus Aktinometermessungen.** [Ozone determination fro actinometer measurements.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser.* Vienna, 7(2):212–222, **1956.** 5 figs., 4 tables, 4 refs., 16 eqs. German, English and Fren

ummaries p. 212. **DWB**—It is shown that by measuring the intensity of solar radiation in ree narrow bands of the visible spectrum separated by the Schotts coloured glass filters: G 7, OG 1, OG 2, RG 2 and RG 5, where practically only Rayleigh-scattering, aerosol ex- nction and ozone absorption occur, it is possible to determine the total amount of ozone bove the station and the Ångström parameters of the aerosol extinction. The error of this mplification is found to be negligible. The procedure, with slide-rule and nomographs hich permit the fast and simple calculation, is described. *Subject Heading:* **1. Ozone measure- ent techniques.**—*Author's abstract.*

7.9–161 551.521.31:551.501.4

Whillier, Austin, **The determination of hourly values of total solar radiation from daily ummations.** *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B*, Vienna, 7(2):197–04, 1956. 3 figs., table, 4 refs., 8 eqs. English, German and French summaries p. 197–198. **WB**—The ratios of hourly to daily total (sun+sky) radiation on a horizontal surface are lotted for: a) Windhoek, Pretoria and Cape Town; b) Durban; and c) theoretical equation, r different durations of sunshine. They are also given for periods between specified hours. orrections are given for finding morning and afternoon radiation separately. These curves hould enable radiation in any part of South Africa to be determined within a few per cent, nd approximations in other parts of the world. *Subject Headings:* **1. Solar radiation calcula- ons 2. South Africa.**—*C.E.P.B.*

7.9–162 551.521.63 551.521.63:612.75

Sauberer, F., **Über die natürliche Ultraviolettstrahlung.** [Natural ultraviolet radiation.] *Vetter und Leben*, Vienna, 7(3/4):80–85, **1955.** 5 tables, 9 refs. **DLC**—The author discusses he long wave and short wave boundaries of UV-radiation, the biological effects of UV-radiation nd the various methods employed to measure it. Data are given on the daily variation of V-antirachitic radiation (sun, sky and total radiation) in lowland for cloudfree skies ("Davos" nits upon a horizontal surface), daily totals of UV-antirachitic radiation on cloud-free days n lowlands (relative values), its intensity upon a standing individual and its intensities at ifferent elevations above sea level. *Subject Headings:* **1. Ultraviolet solar radiation 2. Anti- achitic radiation.**—*I.L.D.*

AIR TEMPERATURE

See also: **Air temp. extremes in two tamarack sites** (Turnock), 7.9–63; **Frosts in France** (Garnier), 7.9–78; **Monthly mean temp. normals** (Böer, Lorenz), 7.9–83; **Numerical temp. forecasting** (Bodolai), 7.9–107; **Max. temp., Poona** (Raghavendra), 7.9–114; **Upper level cold air advection and dust- and thunderstorm development** (Bhalotra), 7.9–154; **Trawlers in Iceland in winter** (Hay), 7.9–183; **Temp. profile above bare soil** (Lake), 7.9–238; **Climate and body temp. and respiration-rate of buffaloes** (Alim, Ahmed), 7.9–243.

7.9–163 551.524:551.578.41

Hay, R. F. M., **Air temperatures during snowfall at Ocean Weather Station I.** *Meteorological Magazine*, London, 85(1006):107–110, April **1956.** 3 tables, 2 refs. **DWB**—In onnection with capsizing of two trawlers N. of Iceland on Jan. 26, 1955, through accumulation f ice on their rigging, statistics of temperatures at which snow, sleet (i.e., snow+rain) and ail fell at station I (59°N, 19°W) were extracted, with Shawbury for comparison. Mean emperatures of snow and sleet at I were 36.0 and 39.3°F, at Shawbury 31.1 and 35.1°F. urface temperature on such occasions was 2–5°F higher at I than Shawbury. Diurnal ariation is also discussed. *Subject Headings:* **1. Temperature during snowfall 2. North tlantic.**—*C.E.P.B.*

7.9–164 551.524.34

Taguchi, T., **Temperature trend during the recent 50 years.** *Journal of Meteorological Research*, Tokyo, 5(8):681–691, Sept. **1953.** 6 figs., 2 tables, 13 refs. In Japanese; English ummary p. 681. **DWB**—The data used in the present report were taken from World Weather ecords 1891–1940 and the number of selected stations was 60 and 9 in the Northern and

Southern Hemisphere, respectively. In general, the trend of 5-year mean is linear. In high latitudes the coefficient of temperature rise has a large positive value and, on the contrary, the Indian Ocean and neighbouring areas it is negative. In almost all regions of the Northern Hemisphere the trend of temperature rise predominates throughout the summer and winter months. *Subject Heading:* **1. Temperature trends.**—*Author's abstract.*

7.9–165 551.524.4 551.508.29:551.524.4

Fleagle, Robert G., **The temperature distribution near a cold surface.** *Journal of Meteorology*, Boston, 13(2):160–165, April **1956.** 7 figs., 3 refs., 5 eqs. **DWB**—The theory of temperature measurement by vertical deflection of light passing through horizontally homogeneous air is set out. Observations with a range-finder from ground to 100 cm over a cold water surface are plotted. These show at about 10 cm an irregularity in the upward decrease of negative gradient of temperature. This is attributed to a maximum of radiational cooling (6°C/hr at 10 m compared with 3°C/hr above) which is in agreement with theory. *Subject Headings:* **1. Temperature profiles 2. Temperature profile recorders.**—*C.E.P.B.*

7.9–166 551.524.7:551.501.1

Burdecki, F. **Study of temperature distribution in the atmosphere.** *South Africa Weather Bureau, Notos*, 4(3):192–203, **1955.** 6 figs., 21 tables, 18 refs., 8 eqs. **DWB**—The mean zonal temperature of the atmosphere at different latitudes and heights for the months Jan., April, July and Oct. are presented in the form of tables. The values from 50°S to 90°N are those computed by the British Meteorological Office and the remaining ones have been estimated from other rather inadequate data. The temperature field of the atmosphere is expressed in analytical form and the Fourier and power coefficients entering into the analytical expression are also presented in the form of tables, one for each of the four months. By making use of the analytical expression, one can readily carry out spatial integrations and differentiations of temperature needed for certain contemplated investigations. *Subject Headings:* **1. Upper air temperature calculations 2. Zonal temperature profiles.**—*Author's abstract.*

7.9–167 551.524.7:551.588.7

Grober, K. W., **Der Einfluss der Ostsee auf die Temperaturschwankungen in der freien Atmosphäre.** [The influence of the Baltic on temperature oscillations in the free atmosphere.] *Zeitschrift für Meteorologie*, Berlin, 9(11/12):345–348, Nov./Dec. **1955.** 2 figs., 2 tables, 3 refs. **DWB**—The influence of the Baltic is shown by a comparison of upper air temperatures at Greifswald (54°6′N) and Dresden (51°27′N) 1950–54, also at Jakutsk and Soesterberg. The annual range at Greifswald is less than that at Dresden by up to 1°C up to about 12 km. The daily range of temperature in the 500/1000 mb layer is also smaller at Greifswald, but not in the 225/500 mb layer. *Subject Headings:* **1. Oceanic influences 2. Upper air temperature 3. Baltic Sea.**—*C.E.P.B.*

SOIL TEMPERATURE

7.9–168 551.525

*Andó, Mihály, **Adatok a homoktalaj hőmérsékletéhez.** [Data on sand soil temperature.] *Időjárás*, Budapest, 59(4):230–234, July/Aug. **1955.** 3 figs., 5 tables, 8 refs. Russian and German summaries p. 230. **DWB, DLC**—Soil temperature conditions at various depths in quicksand near Üllés are analyzed for clear and cloudy weather. Diurnal temperature variations in quicksand are compared with those in sand with vegetation, both under dry and wet conditions. Suggestions are made regarding the best use of the region for agricultural production. *Subject Headings:* **1. Sandy soil temperatures 2. Agricultural meteorology 3. Üllés Hungary.**—*Trans. of author's abstract.*

7.9–169 551.525.5:550.36

Misener, A. D. (*Univ. of Western Ontario, London, Ontario*), **Heat flow and depth of permafrost at Resolute Bay, Cornwallis Island, N.W.T., Canada.** *American Geophysical Union, Transactions*, 36(6):1055–1060, Dec. **1955.** 3 figs., table, 11 refs. **DWB, DLC**—The program of diamond drilling, carried out by the Dominion Observatory and the Meteoro

ogical Division, at Resolute Bay during the summers of 1950 to 1953, permitted the placing f thermistors at various intervals to a maximum depth of 650 ft. The thermal conductivity f core samples was determined by the divided-bar method. The average conductivity ombined with the high reciprocal gradient (25.4 m/°C) give a value of the heat flow toward he surface of $2.9\pm0.4\times10^{-6}$ calorie cm^{-2} sec-1. Extrapolation of the temperature versus epth graph indicates that the permanently frozen region extends to a depth of 1280 ± 10 ft. *Subject Headings:* **1. Permafrost temperatures 2. Permafrost depth 3. Heat flow 4. Resolute Bay, Canada.**—*Author's abstract.*

WATER TEMPERATURE

7.9–170 551.526.6

*Polli, Silvio, **La temperatura del mare a Trieste in un decennio de osservazioni.** [Sea emperature at Trieste from a decade of observations.] *Trieste. Istituto Geofisico, Pubblicazioni*, No. 215, **1946.** 18 p. 14 tables. **DLC**—Temperature of sea measured from 934–43 at 2 m depth, 100 m from shore at Trieste. Data summarized and discussed with respect to means, extremes, etc. of daily and monthly values each year, and presented in tables. *Subject Headings:* **1. Sea temperature data 2. Trieste.**—*M.R.*

7.9–171 551.526.6:551.511

Stommel, Henry; Veronis, George; Jung, Glenn H. and Gilcrest, Robert A., **Comments on "Heat budget of a water column, autumn, North Atlantic Ocean."** *Journal of Meteorology*, Boston, 13(2):222, April **1956.** 3 refs. **DWB** –Stommel and Veronis, referring to Jung and Gilcrest (*Journal of Meteorology*, 12:152–159, 1955, *see* 6.8–243, Aug. 1955, *MAB*) point out that computed and observed heat variations would agree better if Freeman's assumption that horizontal pressure gradients in deep water are much smaller than in surface layers is omitted; it is probably incorrect. Jung and Gilcrest agree. *Subject Headings:* **1. Sea temperature budget 2. North Atlantic.**—*C.E.P.B.*

PRESSURE AND WIND

PRESSURE

See also: **Standard deviation of contour height and standard wind vector** (Jenkinson), 7.9–74; **Velocity of baric centers** (Gandin, Sinel'nikova), 7.9–117; **Ageostrophic wind component** (Rein, Satrapa), 7.9–177.

7.9–172 551.541:662.2:539.1

Japan. Central Meteorological Observatory, **Preliminary report on the atmospheric pressure oscillation due to the H-bomb explosion.** *Geophysical Magazine*, Tokyo, 26(3):215–223, March **1955.** 5 figs., 4 tables, 3 refs. **DWB** –The pressure oscillation and the tidal wave which seem to have been started by the H-bomb explosions at Bikini atoll in the Pacific, about 3500–4500 km away from Japanese weather stations are examined. The pressure wave is found to propagate with a velocity of about 285–307 m/s, its maximum amplitude being about 0.5 mb. The amplitude seems to be slightly affected by topography. The tidal wave of small amplitude, the period of which is about 12 min. is also perceived at several ports facing the Pacific, and its velocity of propagation may be expressed fairly well by the formula $v=\sqrt{gh}$. *Subject Headings:* **1. Pressure oscillations 2. Bikini H-bomb tests 3. Nuclear explosion effects 4. Japan.**—*Author's abstract.*

7.9–173 551.541:662.2:539.1

Yamamoto, R., **Microbarographic oscillations due to H-Bomb.** *Weather*, 11(5):170, May **1956.** fig. **DWB** –On Nov. 22, 1955, oscillations due to H-bomb explosions in the U.S.S.R. were detected at Kyoto, Okayama and Yonago, and are reproduced. The wave traveled at 374 m/s from 293°. The structure of the traces is discussed. *Subject Headings:* **1. Microbarometric oscillations 2. Thermonuclear explosions.** –*C.E.P.B.*

7.9–174 551.54

*Schwerdtfeger, Werner and Prohaska, Fritz, **Der Jahresgang des Luftdrucks auf c Erde und seine halbjährige Komponente. (Darstellung sowie Betrachtung der Ursach und Beziehungen zur allgemeinen Zirkulation der Atmosphäre.)** [The annual variation atmospheric pressure on the earth and its half-yearly component: its causes and relations the general circulation.] *Meteorologische Rundschau*, Berlin, 9(3/4):33–43, March/A **1956.** 6 figs., 8 tables, 25 refs. English summary p. 33. **DLC**—From an analysis of pressu series (mainly 1901–39) for 250 places, world maps of phase (date of maximum) and amplitu of the first and second harmonics of annual variation of pressure are plotted and discusse The semiannual component is attributed to the semiannual component of the difference radiation totals between high and middle latitudes, causing a similar variation in the zo currents. The pressure difference in the S. Hemisphere is compared with the variation upper winds over the Falkland Islands and surface winds in S. Orkneys, which in turn influen precipitation. *Subject Headings:* **1. Annual pressure variations 2. Global pressure variation** —*C.E.P.B.*

7.9–175 551.543.2:551.521

Schwerdtfeger, Werner and Prohaska, Fritz, **The semi-annual pressure oscillation, i cause and effects.** *Journal of Meteorology*, Boston, 13(2):217–218, April **1956.** 2 table 8 refs. **DWB**—Latitude means of semiannual pressure oscillation and ratio to annual, a compared with annual variation of radiation. The main cause is found at high levels middle and subpolar latitudes and is attributed to intensification of zonal currents by mer dional differences of incoming solar radiation. *Subject Headings:* **1. Semiannual pressu variations 2. Solar radiation variations.**—*C.E.P.B.*

7.9–176 551.547

Austin, James M. and Krawitz, Lowell, **50-millibar patterns and their relationship tropospheric changes.** *Journal of Meteorology*, Boston, 13(2):152–159, April **1956.** 10 figs table, 6 refs. **DWB**—Besides short fluctuations, 50 mb heights show long (10–15 day) perio of large (e.g., 5000 ft) fall or rise in high latitudes. Charts of 3-day means eliminate sma irregularities. Major ridges are warm and troughs cold; in 70°N they move E about 5–7 a day and have a half wave-length of 100°, air rising from ridges to troughs. Charts are give for American region. The changes are greatest in winter and are attributed to unstab baroclinic flow due to radiational cooling in polar regions, but irregular corpuscular radiatio may be a factor. In high latitudes the changes are damped downwards, but may affect th troposphere; in low and middle latitudes the 50 mb changes are damped troposphere change *Subject Heading:* **1. Upper air pressure variations.**—*C.E.P.B.*

TURBULENCE

See also: **Bent-over plume of hot gas** (Priestley), 7.9–130; **Eqs. for vertical exchange of water vapor and heat content** (Schmitz), 7.9–137; **Geologic-climatic dating** (Antevs), **7.9–232.**

7.9–177 551.55:551.542

Rein, František and Satrapa, Oldřich (*Prague Univ., Met. and Clim. Inst.*), **Něketer číselné hodnoty ageostrofické složby větru.** [A few numeric values of the ageostrophic win component.] *Meteorologické Zprávy*, Prague, 8(2):43–47, April 30, **1955.** 5 figs., 3 table 6 refs., 8 eqs. Russian and English summaries p. 43. **DWB**—The differences between th geostrophic wind and the ageostrophic vectors are derived. Approximate values of th coefficient of friction are also given. The measured vectors of the wind from Prague an Milešovka (Donnersberg) have been used. The geostrophic wind at Prague has been estimate from the surface pressure pattern; at Milešovka the mean vector of geostrophic flow at th surface and the 850 mb level have been used. It is found that the angle between the mea geostrophic and actual winds is 50° in the lowland, but only 25° in the highland on the mou tain's top 300–400 m above the surroundings. According to the measurements at Milešovk the ageostrophic wind direction deviates at an angle of 80° to the left from the actual directio

the wind. The mean value of the coefficient of friction is found to be 1.63×10^{-4} sec^{-1} for e lowland and 0.54×10^{-4} sec^{-1} for the hilly region (on the top of Milešovka). *Subject eadings:* **1. Ageostrophic winds 2. Geostrophic winds 3. Milešovka, Czechoslovakia.**—*uthors' abstract.*

7.9–178 551.551:532.517.4

Batchelor, G. K. (*Trinity College, Cambridge*), **Diffusion in a fluid in turbulent motion.** *pplied Mechanics Reviews*, N. Y., 9(3):89–91, March **1956.** 15 refs. **DLC, DWB**—A view of the most recent advances in turbulent diffusion study (turbulent vs. convective ansport , with emphasis on homogeneous turbulence, shear flow with partial homogeneity, iffusion from a steady source in shear flow, and relative diffusion of a marked fluid. The atistical relationships are considered paramount. *Subject Heading:* **1. Turbulent diffusion fluids.**—*M.R.*

7.9–179 551.551

Garriock, A. (*Central Met. Bureau, Melbourne*), **Case of clear air turbulence at medium titudes.** *Australian Meteorological Magazine*, Melbourne, No. 9:44–54, June **1955.** 4 figs., ble, eqs., 7 refs. **DWB**—D.C.6 aircraft flying at altitudes between 11,000 and 19,000 feet tween Melbourne and Sydney on July 7, 1954, reported severe turbulence in clear air above oud with a marked limit of turbulence to the northwest. Various factors favouring tur- ulence in the atmosphere—hydrostatic instability, Richardson criteria, and terrain, are nsidered and it is shown that the last is the only factor which cannot be eliminated. *Subject eadings:* **1. Clear air turbulence 2. Australia.**—*Author's abstract.*

WIND

See also: **Thermally produced circulations** (Böhme), 7.9–140.

7.9–180 551.553.1(521.16)

Mukade, T., **On the diurnal variation of the wind at Inawashiro.** *Journal of Meteorological Research*, Tokyo, 5(6):517–524, July **1953.** 16 figs. In Japanese; English summary 524. **DLC**—The author reports results of observations of wind direction and velocity at nawashiro located at the entrance of a valley extending from Lake Inawashiro to the NNE ith a gentle slope. Wind direction coincides with the direction of the valley when there are markable shifts in wind direction. In such cases wind velocity is small and the shifts bear e character proper to land and sea breezes. Some relationship seems to exist between ind and surface temperature of the lake. At 10 a.m. prevailing winds at Inawashiro and Fukura on the opposite shore show opposite directions. The time of wind shifts is 7.30 a.m. nd 7.30 p.m. *Subject Headings:* **1. Land and sea breezes 2. Diurnal wind variations 3. Inawashiro, Japan.**—*Author's abstract.*

SPECIAL WINDS

7.9–181 551.555.6

Eckardt, Gerhard, **Ein Norder im Golf von Tehuantepec.** [A norther in the Gulf of ehuantepec.] *Wetterlotse*, Hamburg, No. 99:67–70, April **1956.** fig. **DLC**—Description a Tehuantepecer on March 8, 1956. Barometer fell from 1014.4 mb at 10 h to 1007 at 6 h, then rose again. Wind rose suddenly to force 9 from N 10–12 h, backed but remained rong to 16 h, then fell to an easterly breeze. Air temperature was 27.2°C at 4 h, 25.9 at 6 h and 28.5 at midnight. *Subject Headings:* **1. Northers 2. Tehuantepecers 3. Gulf of ehuantepec.**—*C.E.P.B.*

WIND EFFECTS

See also: **Water movement dynamics** Wyrtki, 7.9–51; **Distribution of particles at medium range from ground level** (Pasquill), 7.9–129.

7.9–182 551.556:532.59:551.46

Dorrestein, R., **Bemerkungen zu den Wellenbeobachtungen der Wetterschiffe im östlichen Nordatlantik.** [Remarks on the wave observations at Weather Ships in the eastern

North Atlantic.] *Deutsche Hydrographische Zeitschrift*, Hamburg, 8(5):177–186, 195[illegible] 2 figs., 6 tables, 7 refs. German, English and French summaries p. 177. **DWB**—Nation[illegible] differences in observations on U. S., British, French and Norwegian Weather Ships mak[illegible] the study of wave data difficult. In the open North Atlantic the average periods and height[illegible] of swell with light winds (Bft 0–3) are 7.5–8.5 sec and 1.6–1.8 m. *Subject Headings:* **1. Ocean wave height 2. Ocean wave periods 3. Eastern North Atlantic.**—*C.E.P.B.*

7.9–183 551.556:551.524.37:656.61:313.[illegible]

§Hay, R. F. M., **Meteorological aspects of the loss of *Lorella* and *Roderigo* affecting the operation of trawlers to north of Iceland in winter.** *Marine Observer*, London, 26(172):89–9[illegible] April **1956.** 6 figs., 2 refs. **DLC**—On Jan. 26, 1955, the trawlers "Lorella" and "Roderigo" capsized in 67½°N 21°W through accumulation of some 50 tons of ice on decks and rigging in an E–NE gale (synoptic charts given). Temperature was unusually low. The main cause was freezing of sea spray; a spectacular photo on another ship shows how heavy this accumulation can be. Instructions for avoiding this risk are given. Synoptic observations from trawlers in the Arctic are appealed for. *Subject Headings:* **1. Shipwrecks 2. Ice accumulation on ships 3. Greenland Sea.**—*C.E.P.B.*

7.9–184 551.556:551.46:01

†Pierson, Willard J., Jr., **Wind generated gravity waves.** *Advances in Geophysics*, ed. by H. E. Landsberg, 2:93–178, **1955.** 6 figs., 66 refs., eqs. **DLC**—The theory of wind waves is treated systematically, based on the more sophisticated ideas of the statistical nature of wave groups which have been evolved since 1949. First a simple wave, then a wave train, then one and three-dimensional Gaussian systems, the Ergodic theorem, theoretical energy spectra, angular variation of spectrum, sea surface glitter and wave slopes, wave record analysis, ship motions, wave refraction, propagation of wind generated gravity waves, practical methods of observing and forecasting ocean waves and, finally, some unsolved problems are discussed. *Subject Headings:* **1. Wind waves at sea 2. Review articles 3. Bibliography on ocean waves 4. Wind wave bibliographies.**—*M.R.*

UPPER AIR WINDS

See also: **Standard deviation of contour height and standard wind vector deviation** (Jenkinson), 7.9–74; **Constant-pressure balloon trajectories** (Neiburger, Angell), 7.9–86; **Impulse exchange in upper tropos. and zero layer effect** (Böhme), 7.9–132; **Vertical structure of jet stream** (Endlich, others), 7.9–144; **Jet stream data** (Landers), 7.9–145; **Jet stream clouds** (Schaefer), 7.9–146; **E-W motions in aurora** (Bless, others), 7.9–269.

7.9–185 551.557:551.509.5(595)

Clarkson, L. S., **Variation with time of winds at 40,000 ft. and 50,000 ft. over Singapore.** *Meteorological Magazine*, London, 85(1006):99–101, April **1956.** fig., table, 3 refs. **DWB**—The standard vector deviations of winds over Singapore in each month, and the s.v.d.'s of 12 and 24 hr differences, were used to calculate the most probable wind after t hours and its standard vector error. The latter is only 10–20 kn for 12 hours or 13–22 kn for 24 hours ahead. The vector mean wind is also given; using this as a forecast "gives errors of 10–15 kn at 40,000 ft and 15–20 kn at 50,000 ft." *Subject Headings:* **1. Stratospheric wind forecasting 2. Singapore.**—*C.E.P.B.*

7.9–186 551.557:512.9(931)

*Porter, Elizabeth M., **Upper wind over Invercargill.** *New Zealand. Meteorological Service, Technical Note*, No. 94, Dec. 5, **1952.** 7 p. 3 figs., 2 tables. **DWB.** Also: Farkas, Edith, **Upper winds over Invercargill.** *Ibid.*, No. 121, May 16, **1955. DWB**—In the first article mean wind vectors measured at levels up to 80,000 ft at Invercargill from June 1951 to Oct. 1952 are presented. Strongest mean westerly winds were found near 30,000–35,000 ft in spring, summer and autumn, with easterlies above 65,000 ft in later spring and summer. In winter mean winds were westerly at all levels with a broad maximum between 50,000 and

0,000 ft. In the second article the above analysis of upper winds over Invercargill is extended nd mean vector deviations are given for the period of June 1951 to Dec. 1954. Some tests are arried out to ascertain the representativeness of the data at higher levels. *Subject Headings:* **1. Upper air wind vectors 2. Upper air wind data 3. Invercargill, New Zealand.**—*Authors' bstract.*

VERTICAL MOTION

See also: **Cloud physics** (Murgatroyd), 7.9–97; **Bent-over plume of hot gas** (Priestley), 7.9–130; **Vertical structure of jet stream** (Endlich, others), 7.9–144.

7.9–187 551.558.21

†Holmboe, Jörgen and Klieforth, Harold, **Sierra Wave Project.** California. Univ. at L. A. Dept. of Meteorology, Contract AF 19(122)-263, Final report, July **1954.** 59 p. 27 gs., bibliog. p. 5–6, p. 49–54. Scientific Reports on this Contract, with summaries, p. 42–47. **MH-BH**—After a brief summary of the history of mountain lee wave studies, work done nder the cooperative Sierra Wave Project is outlined. The observational program, field tudies in spring 1954, data reduction and the synoptic research program are described. bstracts of theoretical papers prepared under the project are presented. An extensive ibliography on mountain lee wave studies is included. A paper: Klieforth, Harold, **A pre-minary synoptic study of the Sierra Nevada lee wave of December 18, 1951,** is appended. *ubject Headings:* **1. Sierra Wave Project 2. Lee waves 3. Bibliography on mountain lee waves.**—*G.T.*

7.9–188 551.558.29:551.511

Frankenberger, Ernst, **Die Bedeutung des atmosphärischen Vertikalaustauschs in Meteorologie und Wetterdienst.** [The importance of vertical atmospheric exchange in meteorology and the weather service.] *Meteorologische Rundschau*, Berlin, 9(3/4):58–62, March/April **1956.** 4 figs., 5 tables, 19 refs., 6 eqs. **DLC**—In preparation for an investigation f vertical exchange at Quickborn tower (35 m), author discusses a number of problems: space nd time for which vertical exchange coefficients should be defined, dependence of turbulence pectrum on roughness, stratification and height, stress on the surface and the existence of a niversal critical Richardson number. Examples of problems are the part of surface heating f a meadow in the upward transfer of heat, height of the friction layer as a function of wind t 10 m on clear nights, and energy dissipation. *Subject Headings:* **1. Vertical austausch . Turbulence research.**—*C.E.P.B.*

AQUEOUS VAPOR, HYDROMETEORS AND HYDROMETEOROLOGY

HUMIDITY AND EVAPORATION

See also: **Humidity** (Penman), 7.9–7; **Humidity at high altitudes,** 7.9–75.

7.9–189 551.571.4:621.396.029

Collier, James S. (*57 Chapel Ave., Buffalo, N. Y.*), **Upper-air conditions for two-meter DX: temperature and water-vapor content soundings for some famous dates.** *QST*, West Hartford, Conn., 39(9):16–18, Sept. **1955.** 7 figs., ref. **DLC**—Synoptic weather maps give ood clues to the conditions ideal for superrefraction of V.H.F. (2m) radio waves, but upper ir soundings are the only sure indicators since they show existence and location of steep umidity gradients. An example of normal (nonsuperrefractive) temperature and humidity ounding, and 6 other soundings (Joliet, Albany, Pittsburgh, Toledo and Charleston, etc.) how conditions which give two-meter DX. The Charleston sounding indicates no humidity radient (July 23, 1949) at a time when Toledo shows a marked gradient, indicating cause f nonreception at Charleston when conditions in the Northern States were good. *Subject Headings:* **1. Tropospheric propagation 2. Humidity lapse rates 3. Two meter DX 4. Short wave radio propagation.**—*M.R.*

7.9–190 551.57

Hallaire, M. (*Stat. Centrale de Bioclimatologie, I.N.R.A.*), **L'evapotranspiration réelle, mesure et interprétation dans les conditions naturelles.** [Actual evapotranspiration, i measurement and interpretation in natural conditions.] *La Météorologie*, Paris, Ser. 4, N 36:379–401, Oct./Dec. **1954.** 7 figs., 5 tables, 16 refs., eqs. French, English and Italia summaries p. 379. **DWB**—The author states that it is possible to characterize the dryne of the soil and undersoil by a single number S and that effective evapotranspiration E can l evaluated by direct calculation of the water deficiency D. By comparing with potenti evapotranspiration he attempts to define the moment when the plant suffers from lack o water. S and D reach at that moment their critical values representing respectively th drying properties of the culture and the water capacity of a given soil. *Subject Heading* **1. Evapotranspiration 2. Soil moisture deficiency.**—*A.M.P.*

7.9–191 551.57

Penman, H. L. (*Rothamsted Experimental Station, Harpenden, Herts., Eng.*). **Estimatin evaporation.** *American Geophysical Union, Transactions*, 37(1):43–46, Feb. **1956.** table 10 refs., eqs. Also: Blaney, Harry F.; Wilm, H. G. and Penman, H. L. **Discussion.** *Ibid.* p. 46–50. **DWB, DLC**—Evaporation is a physical process that must satisfy two basic re quirements. There must be an energy supply to provide heat of vaporization; and ther must be some transport mechanism for removing the vapor. Combining these concepts it i possible to derive an expression for evaporation rate that depends only on measureable weathe elements. By making some simplifying approximations, the weather data needed reduce t (a) duration of bright sunshine, (b) air temperature, (c) air humidity, and (d) wind speed The quantity obtained is E_o, the evaporation rate for a hypothetical open water surface expose to the measured weather. Formally, and empirically, it is possible to convert E_o into E_t, th potential transpiration rate from a short green crop cover, completely shading the ground an never short of water. This computation has formed the basis of successful experiments i irrigation control; and, with reasonable empirical modification to allow for conditions when water supply becomes a limiting factor, has been applied with some success in studies of th water balance of catchment areas. Applied to two classical American watershed studies i suggests that some of the Coweeta results may need reconsideration. *Subject Headings* **1. Evaporation estimation 2. Evaporation rate.**—*Author's abstract.*

CONDENSATION

See also: **Nucleation of supercooled water clouds** (Mason), 7.9–8; **Mie scattering coeff.** (Penndorf), 7.9–70; **Ice removal from sunshine sphere** (Moon), 7.9–93; **Cloud physics** (Murgatroyd), 7.9–97.

7.9–192 551.574.1:551.510.42

Effenberger, Ernst (*Hygienisches Inst., Hamburg*), **Die Bedeutäng der Kondensationskerne in der hygienischen Forschung.** [Importance of condensation nuclei in hygiene research.] *Geofisica Pura e Applicata*, Milan, 31:197–202, May/August **1955.** 2 figs., 2 tables, 4 refs. English summary, p. 197. **DWB, DLC**—An exhaustive assessment of the degree of contamination of the air is possible only from records of its most important gaseous and corpuscular admixtures. A rough assessment will be possible in many cases by using simultaneous measurements of the nuclei and dust content of the air. A statement on the injurious or annoying effect of an air admixture based only on the determination of the number of nuclei will be possible only in few special cases. As an example it may be mentioned that with the contamination of the air due to tobacco smoke the number of nuclei represents a rough measure of the nicotine content and the number of nuclei together with the number of dust particles is a measure of the content of the tobacco tars in the air. Based on personal investigations and on the results of measurements so far published, highest averages of the nucleus and dust content of the air for various places are given. Thus, it will be possible for the health authorities by means of simple measurements of nuclei and dust concentration to check the prescribed purity of the air. A condition for this is the design of uniform measuring instru-

ients which are very portable and simple to operate. *Subject Headings:* **1. Atmospheric pollution 2. Nuclei count 3. Dust content of air 4. Public health.**—*Author's abstract.*

7.9–193 551.574.1

*Jacobi, W. (*Max-Planck-Inst. für Biophysik, Frankfurt*), **Über die Eisbildung in reinem unterkühltem Wasser.** [Ice formation in pure supercooled water.] *Zeitschrift für Naturforschung, Sec. A*, Tubingen, 10(4):322–330, April **1955.** 11 figs., table, 34 refs. **DLC**—The subject of spontaneous ice formation in pure supercooled water is reviewed from the point of view of earlier investigations. The Volmer theory of ice nuclei formation and its application, laboratory apparatus for testing theory, relation of drop size, temperature, and rate of freezing, the specific free boundary surface energy between ice and water, etc. are discussed, illustrated and numerical results given in tables and graphs. The maximum observed supercooling for 10μ drops is about $-37°$C, is explained on the basis of the Volmer theory and the boundary energy calculated on the basis of the observations and compared with other and theoretical calculations of the energy. *Subject Headings:* **1. Freezing of supercooled water 2. Spontaneous freezing 3. Volmer nuclei theory.**—*M.R.*

7.9–194 551.574.1

Neuwirth, R., **"Kerne" in der Luft: eine Voraussetzung für Niederschläge.** [Nuclei in the air: a prior condition for precipitation.] *Umschau*, 56(7):212–213, April 1, **1956.** refs. **DLC**—Author argues that the increasing pollution of the air by industrial, and now radioactive, particles disturbs the water cycle, which is so important for animals and plants. Particles of 10^{-6} to 10^{-5} cm diameter are especially important for condensation. *Subject Headings:* **1. Atmospheric pollution effects 2. Radioactive condensation nuclei.**—*C.E.P.B.*

7.9–195 551.574.1:778.3

Webb, Willis L., **Particulate counts in natural clouds and fogs.** *Journal of Meteorology*, Boston, 13(2):203–206, April **1956.** 5 figs., table, 8 refs., 2 eqs. **DWB**—A photographic method of counting droplets $>0.75\mu$ radius in fog or stratus illuminated in a narrow oblique parallel beam of light is described and method of calibration given. Some observations on Mt. Weather and Mt. Mitchell are reported; number/cm^3 varied from 34 in radiation fog to 176 in stratus. *Subject Heading:* **1. Cloud droplet photography.**—*C.E.P.B.*

7.9–196 551.574.1

Woodcock, A. H. and Mordy, W. A., **Salt nuclei, wind and daily rainfall in Hawaii.** *Tellus*, Stockholm, 7(3):291–300, Aug. **1955.** 6 figs., table, 16 refs. **DLC**—The discovery of large sea-salt particles at cloud levels led to the hypothesis that these particles act as nuclei on which raindrops initially form within clouds and to the suggestion that the amount of rainfall on an oceanic island might be a function of the number of the salt particles in the air. Exploratory observations of rain and airborne salt in Hawaii, which were intended to test this suggestion, are presented and discussed. These observations do not prove that greater numbers of salt nuclei are related to greater amounts of rain. They do, however, indicate that such a relationship may exist, and that additional field studies should be made which utilize the pertinent results of the present study. (For abstract of preliminary report, *see* 55I–127, Sept. 1955, *MAB.*) *Subject Headings:* **1. Saline nuclei 2. Nuclei and rain 3. Nuclei and wind 4. Hawaiian Islands.**—*Authors' abstract.*

7.9–197 551.574.41

Neumann, J., **Estimating the amount of dewfall.** *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, Vienna, 9(2):197–203, **1956.** table, 12 refs., 17 eqs. English, German and French summaries p. 197. **DWB**—An equation for the flux of water vapor is transformed into one for estimating amount of dew from quantities which can be measured or inferred from routine data in the screen and at grass level. Calculations for central coastal plain of Israel give 0.17 mm dew/night in Jan. and 0.15 mm in July. Observed average is about 0.175. *Subject Headings:* **1. Dew calculation 2. Israel.**—*C.E.P.B.*

FOG

See also: **Fog and its forecasting** (Zverev), 7.9–6; **Objective low stratus forecasting** (Schwarz), 7.9–116.

7.9–198 551.5

Uhlig, S., **"Seerauch" auf dem Lande.** ["Sea smoke" on land.] *Umschau*, Frankfu a.M., 56(9):282, May 1, **1956.** fig. **DLC**—"Sea smoke" is formed when cold air passes ov warm water. A similar phenomenon is described over land in March. A ploughed field w heated by the sun more than an adjoining field of crops. A cold dry NW wind absorb moisture from the ploughed field and under the influence of convection formed a thin lay of fog which vanished abruptly when the air passed on to the crops. *Subject Heading:* **1. A vection fog.**—*C.E.P.B.*

CLOUDS

See also: **Computing global radiation** (Albrecht), 7.9–69; **Cloud physics** (Murgatroyd), 7.9–97; **Convection bubbles** (Scorer, Ronne), 7.9–138; **Jet stream clouds** (Schaefer), 7.9–146.

7.9–199 551.576(42):629.1

Murgatroyd, R. J. and Goldsmith, P., **High cloud over southern England.** *Great Britai Meteorological Office, Professional Notes*, 7(119), **1956.** 19 p. 12 figs., 4 tables, 12 ref **DWB**—Observations of high cloud from the ground are difficult to interpret. Only 25% o aircraft observations show sky quite free. Frequencies of different types of Ci, CiSt and CiC are given. The base is generally in troposphere at 20,000–35,000 ft but a few reports i stratosphere at about 45,000 ft are quoted. Tops are generally <2000 ft below tropopaus distance increasing with height of tropopause. Thickness is 3000–5000 ft, temperature of ba most often −40 to −50°F, of top −40 to −80°F. Humidity averages 80% or less. Note are given on forecasting high cloud and mechanism of formation. Condensation trails are mos persistent when Ci is present. *Subject Headings:* **1. Cirrus clouds 2. Airplane observation 3. Southern England.**—*C.E.P.B.*

7.9–200 551.576.1:629.135.

Hedine, Leonard, J. C. (*W.B.O., Roseburg, Oreg.*), **Clear lane in alto-cumulus clouds** U. S. Weather Bureau, Feb. **1955.** 5 p. ref. carbon of typescript. **DWB**—A case whic occurred at 1225 P.s.t. on Feb. 23, 1951 at Bakersfield, Calif., is analyzed from the point o view of all available weather data and orographic conditions. It is concluded that the rif in alto cumulus deck could only have been caused by the passage of an airplane, but FRITH' (C-196) explanation in terms of a contrail producing seeding is discarded in favor of th hypothesis that clearing was produced by dynamic heating resulting from downward motion induced by plane. *Subject Headings:* **1. Clear lanes in clouds 2. Artificial cloud dissipation 3. Negative condensation trail dissipation 4. Bakersfield, Calif.**—*M.R.*

PRECIPITATION

See also: **Rainfall estimation** (Grunow), 7.9–68; **Cartographic representation of precip.** (Schneider-Carius), 7.9–71; **Cloud physics** (Murgatroyd), 7.9–97; **Chemical composition of air and precip.** (Egner), 7.9–123; **Storm of Oct. 20–21, 1953, Victoria** (Rainbird), 7.9–147; **Precip. patterns in extratropical cyclones** (Conover), 7.9–150; **Effect of flood on house foundations** (Baracos), 7.9–217; **Secular rainfall variation** (Arakawa), 7.9–230; **Geologic-climatic dating** (Antevs), 7.9–232.

7.9–201 551.577.11:061.

Saunders, P. M., **The formation of precipitation.** *Weather*, 11(4):103–106, April **1956 DWB**—Account of conference at Imperial College, Jan. 4–5, 1956. Topics briefly discusse are formation of cloud, theories of precipitation formation (coalescence, condensation on ic crystals) and cloud electrification. *Subject Headings:* **1. Precipitation formation 2. Con ferences.**—*C.E.P.B.*

7.9–202 551.577.2:551.577.34:551.509.33

Suzuki, E. and Tomatsu, K., **On the trends of yearly and monthly amounts of precipitation Japan (Statistical study on the amount of precipitation, Pt. 4).** *Journal of Meteorological esearch,* Tokyo, 7(8):498–506, Oct. **1955.** 4 figs., 2 tables, eqs. In Japanese; English mmary p. 498. **DWB**—The trends of yearly and monthly amounts of precipitation are amined using rank correlation, moving average and deviation sign, and the following results e obtained: In the districts of Hokkaido, Kyusyu and a part of Chugoku, the increasing ends of yearly precipitation amounts are strongly in evidence but cannot be recognized trends in the other districts, except Kanto. Increasing trends in the monthly amount of ecipitation are noted for Sapporo in Jan. and Tokyo in Aug., but cannot be found for other stricts. *Subject Headings:* **1. Precipitation amounts 2. Precipitation trends 3. Japan.** *-Authors' abstract.*

7.9–203 551.577.2(515)

Trefná, E., **Rozdelení srážek na Tibetské Plošině a v přilehlých krajích.** [The rainfall istribution of the Tibetan Plateau and its surrounding regions.] *Meteorologické Zprávy,* rague, 5(2):48–49, **1952.** chart. **DLC**—Review of paper by JOHN LEE (*see* 2F–158, June 951, *MAB*), including chart of average annual total precipitation for Tibet. From available ndian, Chinese and Russian data the author computed annual and seasonal rainfall totals or Tibet and surrounding areas. The seasonal distribution of precipitation reflects the combined effects of monsoonal circulation and orography. *Subject Headings:* **1. Rainfall distribution 2. Tibet. I. Lee, John.**—*G.T.*

7.9–204 551.577.3:551.590.25

Bowen, E. G., **The relation between rainfall and meteor showers.** *Journal of Meteorology,* oston, 13(2):142–151, April **1956.** 6 figs., 5 tables, 12 refs. **DWB**—Numbers of freezing uclei change rapidly from day to day, and so does rainfall. Jan. daily rainfall for numerous ations in many parts of the world shows maxima on or near Dec. 29–Jan. 2, Jan. 12, Jan. 22 nd Feb. 1. These are attributed to meteor showers on Dec. 2, Dec. 13, Dec. 22 and Jan. 3, he lag being 29–31 days in each case. The fall time for 4–10μ particles is 30 days. The ields have a 6 year periodicity and so does the rainfall of Dec. 29–31. Meteoric dust also auses noctilucent clouds. The applications to forecasting, general circulation, singularities nd climatic change are discussed. *Subject Headings:* **1. Rainfall variations 2. Meteor hower effects.**—*C.E.P.B.*

7.9–205 551.577.35(421)

Glasspoole, J. and McIntosh, D. H., **The occurrence of spells in London rainfall and emperature.** *Meteorological Magazine,* London, 85(1007):154–155, May **1956.** 2 refs. **DWB**—GLASSPOOLE criticizes MCINTOSH's article (*Met. Mag.,* 84(1002):366–372, Dec. 1955, *ee* 7.5–208, May 1956, *MAB*) and states that chances of a month being wet or dry do not epend on past 4 months. MCINTOSH more or less agrees. *Subject Headings:* **1. Rainy spells . Dry spells 3. London, Eng.**—*C.E.P.B.*

7.9–206 551.577.36:551.501.6(624)

*Sudan. Meteorological Service, **Frequency of daily rainfalls of specified amounts in he Sudan.** Its *Pamphlet,* No. 6, Oct. **1955.** 5 p. 4 figs., 2 tables. **DWB**—A graph shows bserved and computed annual rainfall frequencies for 7 stations in the Sudan with 27 to 54 ears of record, and another shows observed probabilities of daily rainfall based on 28 stations 26 to 54 years of observation). Most of the data are for 1921–50 grouped in class intervals of 1–2, 3–4, 5–8, 9–16, 17–32, 33–64, 65–128, and 129–200 mm and over of monthly rainfall. Methods and exceptions to the linear rule (for daily amounts) or the logarithmic law (for nnual amounts) are noted in text and illustrated by appended nomograms and tables. *Subject Headings:* **1. Rainfall frequency graphs 2. Sudan. I. Matthews, L. S.**—*M.R.*

7.9–207 551.577.37:519.241.8(673)

Azevedo, Arlo Lobo, **Probabilidades de ocorrência de aguaceiros de altura excepcional em Luanda.** [Probability of exceptionally heavy downpours in Luanda.] *Agronomia*

Angolana, Luanda, No. 9:157–161, **1954.** 2 tables, 2 refs., eqs. English summary p. 1 **DWB, DA**—Statistical analysis of rainfall data for Luanda, Angola (1878–1951), sho probability of heavy rains ($\geq$ 50 mm or 2 inches in 24 hours) during a given year to be

0 = 24 or 33%		3 = 5 or	7%
1 = 22 or 30%		4 = 4 or	6%
2 = 15 or 21%		5 = 2 or	3%
		72	100%

The Poisson distribution gives a frequency of 20, 25.6, 16.5, 7.1, 2.3, 0.6, 0.13 and 0.02 fo to 7 times, respectively, which agrees fairly well. The χ^2 test is applied for various degr of confidence showing goodness of fit. *Subject Headings:* **1. Excessive rainfall probabil 2. Statistical analysis of rainfall 3. Luanda, Angola.**—*M.R.*

7.9–208 551.577.

Corn, Herbert M., **Rainfall depth-duration relationships.** *American Society of Ci Engineers, Proceedings*, Vol. 81, Paper No. 840, Nov. **1955.** 14 p. 6 figs., 2 tables, 3 foot-re **DWB, DLC**—It has long been established that the hydrologic cycle abides by rigorous physic laws. However, the translation of its cyclic-progress to quantitative terms has yet to accomplished. Rationally, it can be assumed that although the physical appearance of natural phenomenon may be progressively changing as it continues through a sequence events, there will be maintained a constant equality between the activating forces and r sultant effects. It is the intention of this paper to present the results of studies which indicate that the complex nature of most short-time precipitation, regardless of patterns, depth durations and frequencies, are reducible to simple "common-denominator" exponenti equations, and that the incremental rainfall periods are usually interdependently proportion to the total storm. *Subject Heading:* **1. Rainfall depth duration relationships.**—*Author abstract.*

7.9–209 551.577.37(44

*Favrot, C., **Les précipitations abondantes à Lyon.** [Heavy rainfall at Lyons.] *Revu de Géographie de Lyon*, 30(4):357–368, **1955.** 4 tables, 10 refs. **DWB**—In this statistic study the occurrence of rain exceeding 10 mm in 24 hours is analyzed (1879–1953). Th observations were made at Tête d'Or Park, Lyons, from 1879 to 1921 and at Bron airpor from 1922 to 1953, the distance between these two points being 10 km. The tables presente and commented on include annual frequency of days with heavy rain, monthly frequencies days with heavy rain listed according to rainfall amount, and daily frequency of heavy rai The annual frequency of rain in excess of 10 mm/day is of the order of 23. *Subject Heading* **1. Excessive rainfall 2. Excessive rainfall frequencies 3. Lyons, France.**—*G.T.*

RAIN AND SNOW

See also: **Hailstone characteristics** (Feteris), 7.9–67; **Temp. during snowfall** (Hay), 7.9–163.

7.9–210 551.578.11:531.6

Engel, Olive G., **Waterdrop collisions with solid surfaces.** *U. S. National Bureau o Standards, Journal of Research*, 54(5):281–298, May **1955.** 15 figs. (incl. photos), 8 refs. 49 eqs. **DWB**—An approach is described to the difficult problem of the dynamics of an im pinging water sphere. The flow in the impact plane is traced chemically. The stages of the collapse of the water mass and of its radial flow are shown in photographs that were take with a high-speed motion-picture camera. Empirical determinations of the time dependenc of the impact force and of the radial flow velocity are reported. The possible occurrence o cavitation in the radial flow is considered. A semiempirical analysis based upon variou simplifying assumptions leads to equations for the maximum impact pressure and for the rat of spread of the water after the collision. *Subject Heading:* **1. Impingement of drops.**—*Author abstract.*

7.9–211 551.578.11:531.32

Magarvey, R. H. and Taylor, B. W., **Shattering of large drops.** *Nature*, London, 7(4512):745–746, April 21, **1956.** 2 figs., 3 refs. **DWB**—Drops 10–25 mm diameter falling rough stagnant air were shattered with considerable violence after a limiting velocity was ached. Photographs show that smaller drops reach a stable shape, but when larger drops ach a critical ratio of minor to major axis the center suddenly bulges upwards and the drop ens like a parachute. The canopy then disintegrates into many smaller droplets; time 1/15 sec. *Subject Headings:* **1. Raindrop distortion 2. Raindrop shattering.**—*C.E.P.B.*

7.9–212 551.578.4

Wexler, Raymond, **The melting layer.** Blue Hill Meteorological Observatory, Contract F 19(604)-950, Meteorological Radar Studies, No. 3, Nov. 30, **1955.** 18 p. 3 figs., 12 refs., 4 eqs. **DWB**—The increase in the fall velocity of a spherical melting snowflake is derived om the assumption that the melting occurs from the outside leaving the inner low density e portion intact. The depth of the melting layer may then be determined as a function of ne lapse rate, the raindrop size, and the initial and final fall velocity. The combined effects f changes in the scattering cross section and in fall velocity of the melting snowflakes on the cation of the peak echo intensity in the melting layer are evaluated. The observed location f this peak in the lower portion of the melting layer is attributed to the larger drops, although ne non-spherical shape of the melting snowflakes may also contribute to this effect. The ifferent melting depths of different snowflake sizes contribute to coalescence in the melting yer, but does not account for the entire increase in echo intensity attributed to coalescence. *ubject Headings:* **1. Terminal velocity of snowflakes 2. Snowflake melt.**—*Author's abstract.*

7.9–213 551.578.41:001

Kosiba, Aleksander, **O nowej klasyfikacji sñiegu atmosferycznego.** [On a new classification of atmospheric snow.] *Przegląd Meteorologiczny i Hydrologiczny*, Warsaw, 7(1/2):19–30, **1954.** 2 illus. English summary p. 29. **DWB, DLC**—The new international classification f snow developed by V. J. Schaefer, G. J. Klein and M. R. de Quervain, accepted by the Congress of the I.U.G.G. at Brussels in 1951 and forwarded to the WMO for approval (from he meteorological viewpoint) is explained with tables and graphs and reviewed in respect o its applicability in Poland. The classification has been found to be incomplete and in eed of modifications both from scientific and practical viewpoints. A number of phenomena nd properties of snow, as classification of avalanche and firn snow have been completely mitted and there are deficiencies in the classification of Arctic snow. For the temperate one (including Poland) the classification should be supplemented by a description of hydrologic properties of snow important for the forecasting of ground water and runoff reserves, which can be best calculated on the basis of snow density according to the shape of the snow rystals, as introduced in Klein's scale of snow density. *Subject Headings:* **1. Snow classification 2. Snow cover 3. Poland.**—*A.M.P.*

7.9–214 551.578.46:551.583.2(52)

Arakawa, Hidetoshi, **Dates of first or earliest snow covering for Tokyo since 1632.** *Royal Meteorological Society, Quarterly Journal*, 82(352):222–226, April **1956.** 2 figs., 3 tables, 3 refs. **DWB**—Dates of earliest winter snow cover 1632–33 to 1869–70, and of earliest snowfall and earliest snow cover since 1876-77 are tabulated and frequency polygons drawn. Secular changes are plotted; average dates of first snow cover were: 1632–1870, Jan. 6.5; 1876–1955, Jan. 15.2. This was partly due to urban development. Dates of earliest snowfall at Kyoto are given since 792-93. *Subject Headings:* **1. Snow cover dates 2. Climatic variability 3. Historical climates 4. Japan.**—*C.E.P.B.*

7.9–215 551.578.71

Mason, B. J., **On the melting of hailstones.** *Royal Meteorological Society, Quarterly Journal*, 82(352):209–216, April **1956.** 4 figs., 2 refs., 16 eqs. **DWB**—The melting of spherical solid hailstones and of graupel (0.3 g/cm³) of various initial radii falling from 0°C 700 mb level through clear air at a uniform higher temperature is calculated. Graphs are drawn of distance of fall for complete melting and of radii of unmelted cores as a function of distance

of fall. The effects of temperature varying with height and of collection of cloud water a examined. *Subject Headings:* **1. Hailstone melting 2. Graupel melting.**—*C.E.P.B.*

HYDROMETEOROLOGY

See also: **Soil-moisture measurement** (U. S. Forest Service), 7.9–2; **Stimulation of rain** (Moran), 7.9–121; **Storm of Oct. 20–21, 1953, Victoria** (Rainbird), 7.9–147

7.9–216 551.5

Ackermann, William C.; Colman, E. A. and Ogrosky, Harold O., **From ocean to sky land to ocean.** *U. S. Dept. of Agriculture, Water: the Yearbook of Agriculture,* 1955:41–5 pub. **1955.** figs., photos, 2 refs. **DA, DWB**—A fairly comprehensive review of the hydrolog cycle; types of storms producing rainfall; snowmelt, ground water percolation, artesian wate etc. accompanied by schematic diagrams. *Subject Heading:* **1. Hydrologic cycle.**—*M.R.*

7.9–217 551.579.4:551.577.61:6

Baracos, A., **Effect of the 1950 Winnipeg flood on house foundations.** *National Researc Council of Canada. Div. of Building Research, Technical Paper,* No. 17, **1954.** [6 p.] photo Reprint from: *Western Construction and Building,* May **1954. DWB**—A combination of a we autumn, frozen ground prior to snowfall, heavy winter snowfall, late and sudden thaw i spring and heavy rains at the time of the thaw resulted in the record floods of 1826, 185 1861 and 1950 in the Red River of the North at Winnipeg; 8200 houses or light buildings wer damaged in April and May 1950. A survey of damage to foundations over a year after th flood revealed extent of damage (not as great as expected) and causes of damage not credite to the immediate flooding. Settling as soil dried out, heaving, cracking and other types c destructive forces are illustrated and described in this article. Some damage was due to re pairs being made too soon after the flood. *Subject Headings:* **1. Floods, Winnipeg (April 1950 2. Building construction 3. Flood damage 4. Winnipeg, Manitoba.**—*M.R.*

7.9–218 551.579.4(436

*Kresser, Werner, **Az 1954 júliusi árviz áz osztrák Dunán.** [July 1954 flood on the Danub in Austria.] *Hungary. Vízgazdalkodási Tudományos Kutató Intézet, Vízügyi Közlemények* No. 1/2:88–105, **1955.** 8 figs., 2 tables, 3 refs. French summary p. (14). Trans. by Zoltán Károlyi. **DWB**—River stage data from Austrian stations on the Danube and its tributaries are presented for the floods of July 1954 and Sept. 1899 (no floods of comparable magnitude occurred between these two dates). Precipitation amounts are tabulated for some 90 stations in the Austrian Danube catchment for June 27–July 12, 1954. The development of the 1954 flood is described and its causes are discussed. Like most major floods in Austria, the 1954 flood was due to extensive precipitation. Frequency of such events is estimated and the possible need for a revision of control policies suggested. *Subject Headings:* **1. River stage date 2. Floods, Danube River (July 1954) 3. Danube River, Austria. I. Károlyi, Zoltán (trans.).** --*G.T.*

7.9–219 551.579(426)

Rigg, J. B., **The hydrology of West Hertfordshire.** *Weather,* 11(4):110–114, April **1956.** fig., 6 refs. **DWB**—Accounts of the Colne Valley dealing with rainfall, calculated percolation, ground water (well levels) and run off. Owing to storage in the chalk, the ratio of minimum to maximum flow is only 1–10. *Subject Headings:* **1. Hydrology 2. Colne Valley, Hertfordshire, Eng.**—*C.E.P.B.*

7.9–220 551.579.5:631.62

Childs, E. C., **The scientific aspects of field drainage.** *Science Progress,* London, 44(174): 208–223, April **1956.** 5 figs., 22 refs., 6 eqs. **DWB**—The study begins with a description of soil as a porous medium and the development of soil moisture profiles. The biological or physical need for drainage must be expressed in quantitative physical terms. The author then turns to the design of drainage systems, to dispose of foreign water or locally precipitated water. Finally, methods are described for measuring the water conductivity of saturated soil. *Subject Headings:* **1. Drainage 2. Soil moisture.**—*C.E.P.B.*

7.9–221 551.579.5:633.2

Klapp, E. and Boeker, P., **Welche Faktoren bestimmen die Höhe des Grünlandertrages?** [Which factors determine the yield of meadows?] *Umschau*, Frankfurt a.M., 56(9):265–267, May 1, 1956. fig., 5 tables. **DLC**—About 40% of the agricultural ground in W. Germany grows forage grasses. These require about 500 mm precipitation during growing period of 170 days. Ground water is an important factor and figures are given connecting yield with ground water level. The German meadows are in great need of fertilizing. *Subject Headings:* **1. Ground water 2. Forage crops 3. West Germany.**—*C.E.P.B.*

CLIMATOLOGY AND BIOCLIMATOLOGY

CLIMATOLOGY

See also: **Climatology by machine methods** (Copeland), 7.9–10; **Solar radiation distribution** (Black), 7.9–156.

7.9–222 551.58:001

†Court, Arnold, **Climatology: complex, dynamic and synoptic.** *Rand Corporation, Santa Monica, Calif., P-769*, Nov. 22, 1955. 28 p. 60 refs. **DWB**—The origin, definitions, applications and clarification of the use of the terms dynamic climatology, synoptic climatology and complex climatology. Complex climatology is defined as the "analysis of the climate of a single place or comparison of the climate of two or more places by the relative frequencies of various weather types or groups of such types. Each weather type is defined by the simultaneous occurrence within specified narrow limits of each of several weather elements." Dynamic climatology conceived by Bergeron, Hesselberg, etc. is properly the climatology of atmospheric dynamics and thermodynamics and synoptic climatology is the "description and analyses of the totality of weather at a single place, or over a small area, in terms of the properties and motion of the atmosphere over and around the place or area." *Subject Headings:* **1. Climatology 2. Terminology.**—*I.L.D.*

7.9–223 551.58:681.177

McDonald, James E., **First annual progress report; cooperative punchcard climatological program. Conducted by the University of Arizona in cooperation with the United States Weather Bureau.** Univ. of Arizona, Inst. of Atmospheric Physics, Nov. 15, 1955. 56 p. 4 figs., tables. **DWB**—In this progress report the experience gained during a year of organizing of progressively expanding punched card program, and actually punching 30 years of record for 15 cooperative observer stations (out of 88), and some first order station data, is summarized systematically, with extensive notes on problems encountered in editing monthly forms, speed of punching by various operators, discrepancies between system used and that at other centers, and possible uses for tabulations in the future for studies of cloud physics, agriculture, hydrology, engineering, industry and commerce as well as general meteorology and climatology. The author rues the fact that no manual of instructions was available to guide him in organizing and coordinating his program with other programs such as the one at Ashville. *Subject Headings:* **1. Punched cards in climatology 2. Punched card programs. I. Arizona. Univ. II. U. S. Weather Bureau III. Des Jardins, R. B.**—*M.R.*

7.9–224 551.58:526.8

Perejda, Andrew D. (*Mich. State College, East Lansing*), **A new climatic chart.** *Journal of Geography*, Chicago, 54(3):129–133, March 1955. fig. **DWB, DLC**—In order to represent other elements besides temperature and precipitation on a climatic chart it is necessary to devise a more complicated presentation than the standard geographer's model climatic chart. The author has done this, and shows and describes a form which will include the elements of cloud cover, wind and pressure as well as rainfall and temperature. It is unfortunate that the chart depicted has no data entered thereon, for it does not give any clear picture of the appearance of the chart in practice. A good feature is the inclusion of both metric and English units. Köppen temperature and precipitation "critical values" are also drawn on the temperature

chart. The author (p. 131–132) is confused as to the definition of "extra tropical cyclone" *Subject Heading:* **1. Climatic charts.**—*M.R.*

CLIMATE OF PARTICULAR PLACES

See also: **Soil erosion, Thuringia** (Schultze), 7.9–240; **Climate of France** (Arléry), 7.9–241; **Climates of Africa and India** (Carter), 7.9–242.

7.9–225 551.582(8

Kunkel, Gunther, **Über den Waldtypus der Robinson-Insel.** [On the forest type Robinson Island.] *Forschungen und Fortschritte*, Berlin, 30(5):129–137, May **1956.** 12 fig. table. **DLC**—This study of the vegetation of Robinson Island includes a section on clima (p. 130–132). Monthly means are given for Cumberland (33°37′S, 78°49′W) for 1954 a daily or hourly temperatures for Jan.–March 1955 at Plazoleta del Yunque, in the middle the woods, with soil temperatures for March. Notes describe erosion by wind and heavy rai *Subject Headings:* **1. Local climates 2. Robinson Island, Chile.**—*C.E.P.B.*

7.9–226 551.582(51

*†Pond, Alonzo W. (*Chief, Desert Branch, A.D.T.I.C.*), **Climate and weather in the centr Gobi of Mongolia.** *U. S. Arctic, Desert and Tropic Information Center, ADTIC Publicatio* D-101, March **1951**; rev. **1954.** 11 p.+append. tables, bibliog. [in] appendix 10, p. 1– **DWB**—The discussion, with sample tables of data, emphasizes erratic character of weather i the Gobi. Data from only about a dozen stations are available, but the maximum of inter pretation is wrung out of the fragmentary data. Temperature, wind, dust, rain, snow, hai clouds and humidity are discussed. Tables give: 1) temperature; 2) precipitation, wind humidity and monthly temperature; 3) temperature ranges obtained on Sven Hedin Expeditio in Gobi; 4) daily temperature range (4 stations); 5) rainy days; 6) precipitation; 7) relativ humidity; 8) rain in Inner Mongolia, 9) wind in Inner Mongolia, 10) bibliography and 11 monthly summaries for 18 stations in general area. *Subject Headings:* **1. Climate of Centra Gobi 2. Climatic data for Mongolia 3. Expeditionary climatic data 4. Gobi, Mongolia** —*M.R.*

7.9–227 551.582.1(5) 551.582.1(58

*Bugaev, V. A., **Klimat Sredneĭ Azii i Kazakhstana.** [Climate of central Asia and Ka zakhstan.] Tashkent, Izdat. Akademii Nauk UzSSR, **1946.** 23 p. 2 tables. **DLC**— This description of the climate of central Asia and of Kazakhstan is largely qualitative con taining some numerical data interspersed in the text. The discussion includes: the weathe regime in Kazakhstan and central Asia, the characteristics and effects of Arctic air, degree o continentality of the climate, climatic zones and the temperature and precipitation regime of the area, and winds, thunderstorms, fogs and other weather phenomena. *Subject Headings* **1. Climate of Central Asia 2. Climate of Kazakhstan 3. Central Asia 4. Kazakhstan** —*I.L.D.*

7.9–228 551.582.2(432

*Hattenbach, Klaus, **Der Landkreis Bad Salzungen: eine Untersuchung über die neuere strukturelle Entwicklung der Kulturlandschaft zwischen Thüringer Wald und Rhön.** [The Bad Salzungen district: an investigation into the new structural development of the cultural landscape between Thuringer Wald and the Rhone.] *Leipzig. Deutsches Institut für Landerkunde, Wissenschaftliche Veroffentlichungen*, N.F., No. 13/14:138–236, **1955.** 27 figs. (incl photos), 17 tables, numerous footrefs., classed bibliog. p. 230–236. **DLC**—Hydrography is discussed on p. 149–153 and climate on p. 153–156 of this detailed monograph. An isohyeta chart shows normal annual precipitation for 1891–1930 for 50 mm intervals for the general area. A brief discussion of the mountain climate—temperature, precipitation, wind, etc.—is included. Tables of monthly mean temperature and variability for 5 or 6 stations, precipitation for 16 stations and variations, frost, snow are found on p. 216–221. *Subject Headings* **1. Climate of Bad Salzungen area 2. Bad Salzungen, Germany.**—*M.R.*

CLIMATIC CHANGES

See also: **Temp. and precip. variations, Europe** (Schulze), 7.9-72; **Earliest snow cover of Tokyo** (Arakawa), 7.9-214.

7.9–229 551.583:551.590.21:523.746

Rodewald, Martin, **H. C. Willetts Klima-Prognose.** [Willett's forecast of climate.] *aturwissenschaftliche Rundschau*, Stuttgart, 9(4):142–149, April **1956.** 6 figs., table. **DWB** Discussion of H. C. Willett, **Extrapolation of sunspot-climate relationships,** in *J. Meteor.*, 1):1–6, Feb. 1951 (*see* 2.8–42, Aug. 1951, *MAB*). Sunspot cycles were extrapolated to 94, but development of sunspot activity in 1951–55 throws some doubt on the forecast. illett's prognosis that temperature in a large part of the world will fall to a minimum in 60–65 has received some support, but it is equally possible that we are near a new polar ice-free" period. *Subject Headings:* **1. Climatic variations 2. Sunspot effects.**—*C.E.P.B.*

7.9–230 551.583.14:551.577.34(519)

*Arakawa, H., **On the secular variation of annual totals of rainfall at Seoul from 1770 1944.** *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B*, Vienna, 7(2):205–211, 956. 3 figs., table, 2 refs. English, German and French summaries p. 205. **DWB**—A in gage was invented in Seoul, Korea, in 1442 and a network established in 1770. Monthly totals (excluding snow) for Seoul are given from June 1770–Dec. 1907. Annual totals and 0-year overlapping means are plotted to 1944. The series before and after 1908 are not screpant, though the early records are too low in dry months. There were periods of deficient infall before 1785 and in 1880–1910. *Subject Headings:* **1. Rainfall trends 2. Long period ecords 3. Seoul, Korea.**—*C.E.P.B.*

7.9–231 551.583.2(52)

Havens, A. V., **Comments on "Climatic change as revealed by the freezing dates of ake Suva in central Japan."** *Journal of Meteorology*, Boston, 13(2):221–222, April **1956.** tables. **DWB**—From frequencies given by H. Arakawa in *Journ. Meteor*, 12:94, 1955 (*see* 5–283, May 1955, *MAB*), it is computed that the mean freezing date in 1701–1954 is 3.46 ays later than in 1444–1700. This is significant at 1% level. Probability of open winters 10.6% 5.1%) is significant at 2% level. *Subject Headings:* **1. Historical climates 2. Freezing f lakes 3. Japan.**—*C.E.P.B.*

7.9–232 551.583.3:529-551.79 551.577.38:551.583.2

†Antevs, Ernst, **Geologic-climatic dating in the West.** *American Antiquity*, Menasha, 0(4):317–335, April **1955.** 6 figs., table, biblio. p. 332–335. **DLC**—The complex principles f late-glacial and post glacial dating in semiarid regions are set out; they depend largely on orrelating changes of temperature and moisture which affect stream processes. Longer hanges are dated by comparison with the Fennoscandian varve series; radiocarbon dating is ncertain. Climatic stages in N. America back to 27,000 B.P. (Before Present) are shown, rith tentative graphs of July temperature and lake levels in Bonneville and Lahontan basins. long dry warm period (the "Long Drought") in the west extended from 7500–4000 B.P., llowing the Provo pluvial. There were shorter droughts about 500 B.C. (Fairbank drought), 30 A.D. (Whitewater), 1276–1299 A.D. (Great drought) and 1573–1593 A.D.; at other times limate was moister than now. *Subject Headings:* **1. Geochronology 2. Quaternary climates . Historic droughts.**—*C.E.P.B.*

7.9–233 551.583.3(7)

Dillon, Lawrence S., **Wisconsin climate and life zones in North America.** *Science*, Vash., D. C., 123(3188):167–176, Feb. 3, **1956.** 13 figs., 35 refs. **DLC**—The limiting climate f ice sheets is set at precipitation 12" and warmest month 45°F. This involves a temperature lecrease in Wisconsin maximum of 25°F at edge of ice sheet, 10°F in periglacial regions and °F in equatorial Andes. Glaciation began with increase of precipitation in Greenland and N.E. Canada from 9" to 15" a year. Peat bog and pollen evidence, described in detail, onfirms this. Reconstructions of mean annual precipitation and winds in Wisconsin com- pared with present show storm tracks displaced southward. Stages in the development of

the glaciation are sketched and distribution of tree and animal species (especially musk ox) discussed in the light of these maps. Rainfall probably increased as far south as Arizona but not in central Mexico. In the Wisconsin, life zones were more crowded than now and there was much intermingling of north and south, but not of east and west species. *Subject Headings:* **1. Quaternary climates 2. North America.**—*C.E.P.B.*

7.9–234 551.583.3(

Smith, H. T. U. (*Dept. of Geology, Univ. of Kansas, Lawrence*), **Geomorphic evidence of recent climatic fluctuation in the Peruvian coastal desert.** *Science*, Wash., D. C., 122(316) 418–419, Sept. 2, **1955. DLC**—A short note describing evidence of: 1) aridity (sand blasting eolian sand), similar to present but windier and/or drier, a few thousand years ago or less followed by 2) decreased wind action probably due to greater humidity and 3) recent change to increased wind action, tentatively correlated with recession of glaciers. Localities 235 km north of Lima. *Subject Headings:* **1. Postglacial climates 2. Peru.**—*C.E.P.B.*

7.9–235 551.583.3:551.311

Tanner, William F. (*Dept. of Geology, Fla. State Univ., Tallahassee*), **North-south asymmetry of the Pleistocene ice sheet.** *Science*, Wash., D. C., 122(3171):642–643, Oct. 7, 1955 4 refs. **DLC, DWB**—It is pointed out that the rainfall which feeds an ice sheet comes from the south, the air rising over cold arctic air on an orographic barrier; an ice sheet 5000 ft thick or more is such a barrier. Hence an ice sheet initiated SE or south of Hudson Bay should grow SE or southward, the faster the higher it grew, and would be most active near its southern margin. It would be stabilized by the location of the jet stream to the south of its margin. *Subject Headings:* **1. Glacial periods 2. Glacier nourishment 3. North America.**—*C.E.P.B.*

7.9–236 551.583.7:525.

Munk, W. H., **Polar wandering: a marathon of errors.** *Nature*, London, 177(4508):553–554, March 24, **1956.** 15 refs., 7 eqs. **DWB**—G. Darwin in 1877 concluded that, the earth being sensibly rigid, movements of the pole must have been limited. Discussions with Lord Kelvin followed, and in 1908 Darwin reversed his view, concluding that pole wandering was easy. No further work was done until T. Gold (1955) supported extensive pole wandering by different arguments. Meanwhile many geologists had explained ice ages by extensive polar movements, and recently rather convincing paleomagnetic evidence has been discovered. *Subject Headings:* **1. Polar displacement 2. Paleoclimates.**—*C.E.P.B.*

7.9–237 551.583.7(93

Squires, Donald F. (*Dept. of Geol. and Paleontol., American Museum of Natural History, N. Y.*), **Climatic interpretation of cenozoic faunal migrations in New Zealand.** *New York Academy of Sciences, Transactions*, Ser. 2, 18(5):415–426, March **1956.** 5 figs., 14 refs. **DLC**—North and South Islands are separated by the boundary between the subtropical Notonectial Current and the Subtropical Convergence between this and the West Wind Drift. Four faunal (oceanic and avian) zones are distinguished. Distributions of corals in mid-Eocene, mid-Oligocene and Lower Miocene are mapped. Subtropical conditions occurred in late Eocene, indicating that Subtropical Convergence lay to the south, and continued through Oligocene, approaching tropical in early Miocene. General cooling began in later Miocene. Pleistocene brought alternating northward and southward migrations of Antarctic mollusca. *Subject Headings:* **1. Paleoclimatology 2. New Zealand.**—*C.E.P.B.*

MICROCLIMATOLOGY

See also: **Met. mission of Army Electronic Proving Ground** (Copeland), 7.9–30; **Neustadt mobile observation station** (Burckhardt), 7.9–85; **Mechanical computer for micromet. research** (Taylor, Webb), 7.9–90.

7.9–238 551.584.32:551.524.4:551.524.3

Lake, J. V., **The temperature profile above bare soil on clear nights.** *Royal Meteorological Society, Quarterly Journal*, 82(352):187–197, April **1956.** 5 figs., 3 tables, 24 refs. **DWB**—

thermistor bead was used (set up described) to measure temperatures at 0.1, 0.5, 2.5, 3.5 d 54" above level bare soil on calm clear nights at Reading. The thermistor showed a fall 1–3°F from 0.1" to a minimum about 2.5", above which temperature rose slowly. Standard iation of temperature was greatest at the surface and least at the minimum layer. A nber of unshielded minimum thermometers were also used at 0.25, 1, 3, 6, 18 and 54". ese showed that the fall of surface temperature was proportional to (time after 1830 G.m.t.). e results suggest that the heat exchange across the temperature discontinuity is very small l direct radiation from the air is important. *Subject Headings:* **1. Temperature gradient ur the ground 2. Minimum temperatures 3. Reading, Eng.**—*C.E.P.B.*

7.9–239 551.584.7(624)

Azevedo, Ario Lobo, **Os solos de Angola e a agricultura: características, distribuição ecnologia de alguns solos de Angola.** [Soils of Angola and agriculture: characteristics, tribution and technology of some of the soils of Angola.] *Agronomia Angolana*, Luanda, . 9:13–106, **1954.** figs., photos, map (col. fold.), 178 refs. French and English sum- ries p. 92–98. **DWB, DA**—On p. 24–29 there is a section entitled **Breve informação natica** (Short climatic summary), giving an account of the chief climatic controls (the nguela Current, the trade winds and local relief), average annual temperatures, temperature remes, seasonal variations in temperature, rainfall variations, seasonal conditions in different ions and, finally, climatic classification (KÖPPEN and THORNTHWAITE). The bulk of the nograph deals with the formation, classification, chemical and physical character, erosion, l other aspects of the soils of Angola. *Subject Headings:* **1. Soil climatology of Angola Angola.**—*M.R.*

7.9–240 551.584.7:551.311:631.4:551.582(432.2)

Schultze, Joachim Heinrich, **Die Bodenerosion in Thüringen: Wesen, Stärke und Abhrmöglichkeiten.** [Soil erosion in Thuringia: nature, intensity and prevention.] *Peterinns Geographische Mitteilungen, Ergänzungsheft*, Gotha, No. 247, 1952. 186 p. 58 figs. me color, some fold.), tables, foot-refs., bibliog. p. 105–108. **DLC**—Climatic and weather tors affecting soil erosion in Thuringia are analyzed on p. 64–83. Some of these factors are: ar radiation on variously oriented slopes, snow, frost, air and soil temperature, rainfall, l moisture, vegetation, floods, cloudbursts, snow melt, etc. The text is supported by selected ta from Jena, Wurzburg, Potsdam and other Macro- and microclimatic stations. *Subject adings:* **1. Soil erosion 2. Climate and erosion 3. Thuringia, Germany.**—*M.R.*

CLIMATIC CLASSIFICATION

See also: **Plant ecology** (UNESCO), **7.9–1.**

7.9–241 551.585

Arléry, R.; Garnier, M. and Langlois, R. (*all, Serv. Mét. de Métropole et d'Afrique du rd, Paris*), **Application des méthodes de Thornthwaite à l'esquisse d'une description conomique du climat de la France.** [Application of the Thornthwaite method to an outline an agronomical description of the climate of France.] *La Météorologie*, Paris, Ser. 4, . 36:345–367, Oct./Dec. **1954.** 15 figs., 7 tables, 16 refs. French, English and Italian nmaries p. 345. **DWB**—THORNTHWAITE's concepts and methods of classification of nates are expounded and applied to the study of the climate of France. Tables and graphs abling one to calculate, according to THORNTHWAITE's formula, the potential evapo- nspiration based on mean monthly temperature data are presented and the calculating nciple is explained. Maps showing the distribution of temperature in France for 1891–30, calculated at 340 stations, are presented. The method used by THORNTHWAITE for culating the mean annual balance of ground water is expressed in an example (Angoulême 1891–1930). After a brief discussion of THORNTHWAITE's four classification criteria, the thors present several maps resulting from the application of the method to temperature and cipitation data, and a table showing the characteristic features of 30 stations determined cording to THORNTHWAITE's method. *Subject Headings:* **1. Thornthwaite's method Thornthwaite's classification 3. Climate of France 4. France.**—*A.M.P.*

7.9–242 551.585(6)(5

*Carter, Douglas B., **Climates of Africa and India according to Thornthwaite's 19 classification.** Johns Hopkins Univ. Laboratory of Climatology, Contract Nonr-248(4 Final Report, **1954**; *Publications in Climatology*, 7(4):453–474, **1954.** 2 plates (fold. laid i **DWB**—The various climatic indices of the 1948 Thornthwaite climatic classifications: 1) wa balance potential and actual evapotranspiration, 2) soil moisture utilization, 3) water surpl and 4) water deficiency were determined for the Indian sub-continent and for all of Africa the basis of climatic data from 1200 stations in Africa and 400 in India. Maps showing t average annual potential evapotranspiration, average annual water deficiency, average annu water surplus and moisture regions were prepared for these areas. The accompanying te contains a discussion of the elements of this system of classification with water balance diagra for selected stations, the principles underlying the construction of the maps and an explanati of the maps. Included also are maps showing the average annual precipitation in Africa a in India and vicinity. *Subject Headings:* **1. Thornthwaite's classification 2. Climatic da 3. Climate of Africa 4. Climate of India 5. Africa 6. India.**—*I.L.D.*

BIOCLIMATOLOGY

See also: **Plant ecology** (UNESCO), 7.9–1; **Climate, vegetation and man** (Hadlow), 7.9–4; **Geography and animal husbandry in Angola** (Gellert), 7.9–60; **Ecological investigations** (Schulze), **7.9–95; Dependence of skin permeability on weather . . .** (Lotmar, Häfelin), **7.9–246.**

7.9–243 551.586:551.524.3:636

Alim, K. A. and Ahmed, I. A., **Effects of climate on body temperature and respiration-ra of buffaloes and Friesian cattle.** *Nature*, London, 177(4515):900, May 12, **1956.** tabl **DWB**—Readings of rectal temperature and respiration rate of cows and calves were taken Alexandria, July 23–Sept. 9, 1955. Correlation of air temperature with body temperature buffaloes was +0.10 (not significant); with respiration rate +0.28 (significant). Bod temperature and respiration rate of Friesians was higher than those of buffaloes. *Subje Headings:* **1. Bioclimatology 2. Temperature effects on buffaloes.**—*C.E.P.B.*

7.9–244 551.58

†Lee, D. H. K., **Physiological climatology.** (In: James, P. E. and Jones, C. F. (*eds.* **American geography.** Syracuse Univ. Press, **1954.** p. 470–483. 23 refs.) **DWB**—Th development of ideas on the effect of climate upon human beings since HIPPOCRATES an including ELLSWORTH HUNTINGTON and the experimental physiological approach to th study of climatic effects on physiological climatology is reviewed. The practical applicatio of physiological climatology to housing, clothing and animal industry, and its use in the regiona concept in geography are discussed. *Subject Heading:* **1. Physiological climatology.**—*I.L.D.*

7.9–245 551.586:632.7:634.

Pratt, Robert M. (*Univ. of Florida, Citrus Experiment Station, Lake Alfred*), **Meteorologica problems in the forecasting of citrus insect infestations.** *American Meteorological Society Bulletin*, 36(9):436–439, Nov. **1955.** 2 figs., 2 tables, 4 refs. **DWB, DLC**—As a basis fo forecasting infestations, data on insect and mite populations have been collected from 13 representative central Florida citrus groves at monthly intervals during a four year period To some extent, forecasts can be based on recurring annual cycles, but to obtain a highe degree of precision, information must be obtained on the factors which regulate populations Weather conditions affect the life span and mortality of insects and mites directly, and als indirectly through effects on the abundance and efficiency of parasites, predators and disease December temperatures have been found to be a factor in the abundance of six-spotte mites in succeeding months through June. The populations of this and the citrus red mit are inversely correlated with rainfall. Other temperature and moisture relations have bee established but extensive further microclimatological studies are needed. *Subject Heading* **1. Insect forecasting 2. Citrus mites 3. Weather effects on insects 4. Florida.**—*Author abstract.*

ENVIRONMENTAL INFLUENCES

See: **Influence of Baltic on temp. oscillations** (Grober), 7.9–167.

SYNOPTIC CLIMATOLOGY

7.9–246 551.589.1:591.14 551.586:612

Lotmar, Ruth and Hafelin, Joh, **Über die Abhängigkeit der Hautpermeabilität von der Witterung (Versuche mit radioaktiv markiertem Natriumsulfat an Kaninchen).** [Dependence of skin permeability on weather (research with radioactive sodium sulfate markers in rabbits).] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B*, Vienna, 7(2):286–296, **1956.** 2) refs. German, French and English summaries p. 286. **DWB**—Authors had previously (*Arch. Met. Geoph. Biokl., Ser. B*, 7:133, **1955**; *see* 7.5–228, May 1956, *MAB*) found a clear correlation between sulfur excretion of rabbits and days of incursion of fresh polar air. In this investigation permeability of intact skin for radioactive sodium sulfate (S35) is studied over 5 months. "On days without any fronts, and particularly on cold front days, values of low permeability were obtained, whereas on warm front days or under the influence of fohn, and especially in phases of occlusions, higher degrees of permeability were obtained." *Subject Headings:* **1. Air mass effects 2. Sulfur excretion 3. Rabbits.**—*C.E.P.B.*

MISCELLANEOUS

COSMIC INFLUENCES

See also: **Rainfall and meteor showers** (Bowen), 7.9–204; **Willett's forecast of climate** (Rodewald), **7.9–229.**

7.9–247 551.590.2

Piccardi, Giorgio (*Univ. of Florence*), **Fenomeni ambientali e fenomeni chimicofisici: alcune deduzioni dopo tre anni di ricerche.** [Environmental phenomena and chemico-physical phenomena: some deductions from 3 years' research.] *Geofisica e Meteorologia*, Genoa, 5(1/2):9–12, Jan./April **1954.** 5 figs., 2 refs. **DWB**—Continuation of work reported in *ibid.*, 1(1):18–19 and 1(2/3):42–44, Jan./Feb., March/June, **1953** (*see* 7.3–276, March 1956, *MAB.*), showing variations during Feb. 1951–March 1954 (46,000 tests) in precipitation of BiOCl under varying atmospheric conditions. Half of the tests were in enclosed and half in free space. The seasonal effects which show so clearly on the charts may be due to pressure changes, or perhaps to cosmic radiation variations which accompany pressure changes. Temperature changes are eliminated as a cause by several months' record with constant (17°–19°C) temperature of the water. Records are compared with those at Innsbruck (Hafelekar observatory 2200 m). *Subject Headings:* **1. Precipitation of BiOCl 2. Pressure effects 3. Cosmic influences on precipitation of chemicals.**—*M.R.*

7.9–248 551.590.25:551.501.81

Davies, J. G. (*Univ. of Manchester, Jodrell Bank Experimental Station*), **Radio measurements of individual meteor orbits.** (In: Kaiser, T. R. (*ed.*), **Meteors.** London, Pergamon Press, **1955.** p. 157–158. fig., 3 refs.) **DWB**—Radio echo measurements of meteor orbits made since 1946 by the range-time technique, and by the diffraction method, using both continuous and pulsed transmission, are described. A single meteor trail was observed from 3 stations 4 km apart by the Davies and Ellyett (1949) method as illustrated. By studying the diffraction patterns, the rate and direction of movement can be determined, and hence the radiants. The method was first used in the 1953 Geminid Showers and for every major shower since, with accuracy of 3% in speed and 2° in radiant for 200 300 orbits per day, or accuracy up to 10% for 2 or 3 times as many. Irregular winds in upper atmosphere are main source of error. *Subject Headings:* **1. Meteor trail observation 2. Radio meteor measurement.** —*M.R.*

7.9–249 551.590.25 52

Van Diggelen, J. and de Jager, C. (*both, Sterrewacht Sonnenborgh, Utrecht, Holla*
On some recently observed fireballs. (In: Kaiser, T. R. (*ed.*), **Meteors.** London, Pergam
Press, **1955.** p. 162–167. 2 figs., table, 9 refs.) **DWB**—Data are collected on 14 fireba
observed in the Netherlands from 1947 onward. Three times in the last seven years so
fireballs with the same radiants appeared in a lapse of a few days only, thus confirming
suggestion that swarms of fireballs do really exist. A number of these fireballs showed co
with diameters ranging from 200 to 1000 m. The existence of a coma can perhaps be explai
on the basis of the excitation of air molecules by ultra-violet radiation of the meteor h
Subject Headings: **1. Meteors 2. Meteor trails 3. Netherlands.**—*Authors' abstract.*

VISIBILITY

7.9–250 551.591:629

Appleman, H. (*Air Weather Service, Wash., D. C.*), **Note on the effect of aircraft exha**
on airport visibility. *American Meteorological Society, Bulletin,* 37(1):19–21, Jan. 19
2 figs., 8 refs. **DWB, DLC**—In connection with changes in weather conditions caused a
parently by landing of a number of jet aircraft at Goose Bay, Labrador, a study of alle
seeding by the aircraft and of the way in which these aircraft may influence visibility a
ceiling was carried out. *Subject Headings:* **1. Airport visibility 2. Goose Bay, Labrad**
—*I.L.D.*

7.9–251 525.38:551.591.1:518

Lange, O., **Leitertafeln für die Berechnung von Sonnenhohen und Trübungsfaktore**
[Nomograms for calcultating solar altitudes and turbidity factors.] *Zeitschrift für M*
teorologie, Berlin, 9(11/12):356–365, Nov./Dec. **1955.** 7 figs., table, 8 refs., 24 eqs. **DWB**
Tables and nomograms for sun height are constructed for local time and declination for latitud
47°–55°. A simplification is introduced for determining LINKE's turbidity factor. A machi
for easy reading of the nomograms is illustrated. *Subject Headings:* **1. Sun's height 2. Tu**
bidity factor 3. Nomograms.—*C.E.P.B.*

7.9–252 551.591.3(42

Bonacina, L. C. W. and Carter, C. I., **Visibility over London during summer of 195**
Weather, 11(4):115–117, April **1956.** table. **DWB**—Evening visibility in the hot dry summ
of 1955 was less than in previous 5 years. This was due to the house fires of the cold Ma
and the smoke and dust from the industrial east of London. *Subject Headings:* **1. Visibili**
2. London, Eng.—*C.E.P.B.*

OPTICAL PHENOMENA

7.9–253 551.593 398

Carpineti, Franco, **Osservazione di un oggetto volante.** [Observations of a flying object
Rivista di Meteorologia Aeronautica, Rome, 14(3/4):45–46, July/Dec. **1954.** 2 figs. **MH-BH**
The author observed a lens shaped luminous object at 0316 on June 29, 1954 in Cagliar
moving too fast for an airplane and too slow for a meteor. A diagram shows several positio
of the object in relation to the observatory and topography. The fire ball (bolide) was o
served at Livorno and Sanluri at times which agree with those of the observer (0300 and 0330
but a report from Vermo (2307 on 28th) does not fit in with the above picture. *Subje*
Headings: **1. Flying saucers 2. Bolides 3. Cagliari, Italy.**—*M.R.*

7.9–254 551.593.1

Fellgett, P. B.; Megaw, E. C. S. and van Isacker, J., **Stellar scintillation.** *Royal M*
teorological Society, Quarterly Journal, 82(352):227–234, April **1956.** 2 figs., 8 refs. **DWB**
FELLGETT comments on discussion (*Q.J.,* 80:241, **1954;** *see* 5.10–10, Oct. 1954, *MAB*). H
defines scintillation more closely and points out that irregularities of refractive index cann
give rise to variations of brightness but merely to a spreading out of the light. MEGA
replies that FELLGETT's treatment is incorrect, and VAN ISACKER that the discrepancy is on
formal. FELLGETT comments on the replies. *Subject Heading:* **1. Scintillation of sta**
—*C.E.P.B.*

7.9–255 551.593.61

Vassy, E. (*Univ. de Paris*), **Sur un phénomène optique observé en avion.** [Optical phenomenon observed from an airplane.] *La Météorologie*, Paris, Ser. 4, No. 36:441–442, Oct./Dec. **1954. DWB**—This is a comment of a member of the editorial board on an article published previously explaining that the optical phenomenon observed from airplanes and described by BARATOUX (*see* 6.9–321, Sept. 1955, *MAB*) was nothing more than an "anti" solar corona (halo) or anthelion, sometimes called Brocken spectre or glory. *Subject Heading:* **Brocken spectre.**—*A.M.P.*

7.9–256 551.593.63(661)

Sandner, Werner, **Halo-Beobachtungen in der algerischen Sahara und Vergleich mit deren Reihen.** [Halo observations in the Algerian Sahara and comparison with other series.] *Zeitschrift für Meteorologie*, Berlin, 9(11/12):353–356, Nov./Dec. **1955.** 2 tables, refs. **DWB**—Records of 14 stations between southern edge of Atlas Mountains and northern boundary of Nigeria, for 11–20 years, are tabulated and compared with a station on the Mediterranean coast and Helwan (Egypt). The annual frequency varies from 5.4 to 14.6 compared with 23.6 on coast. The principal maximum is in Nov. or Dec. with a secondary max. in early spring and a minimum in July and Aug. *Subject Headings:* **1. Halo observations Sahara.**—*C.E.P.B.*

7.9–257 551.593.63(43)

Voigts, Heinrich, **Halobeobachtungen in Lübeck 1948–1955 und ihre Auswertung.** [Halo observations in Lubeck and their evaluation.] *Zeitschrift für Meteorologie*, Berlin, 9(11/12): 350–353, Nov./Dec. **1955.** 2 figs., 6 tables, 5 refs. **DWB**—Monthly numbers of solar and lunar haloes at Lubeck (1948–55) and Munich (1928–54) are tabulated and discussed. Frequencies are divided according to the frontal situation, and their forecasting value indicated. No connection could be found with the sunspot cycle. Duration frequency is tabulated. *Subject Headings:* **1. Halo observations 2. Lubeck, Germany.**—*C.E.P.B.*

7.9–258 551.593.652

Ashmore, S. E., **Rare solar haloes.** *Weather*, 11(4):135, April **1956. DWB**—Referring to optical phenomena described by J. A. CRABBE, author describes a long band of brilliant iridescent cloud seen in Wales in 1942. *Subject Heading:* **1. Nacreous clouds.**—*C.E.P.B.*

ELECTRICAL PHENOMENA

7.9–259 551.594 550.37

Chalmers, J. A. (*Durham Colleges, Univ. of Durham*), **Induced charges and the fine-weather field.** *Journal of Atmospheric and Terrestrial Physics*, London, 4(1/2):84–85, **1953.** 3 refs., eqs. **DWB**—Charges induced in the earth and in the ionosphere by passing thunderclouds, as well as charges brought down to the earth in the storm, can affect the vertical electric gradient. A theoretical model and some quantitative estimates of magnitude of charges are presented in this note. *Subject Headings:* **1. Terrestrial electricity 2. Electricity of fair weather 3. Thunderstorm electricity 4. Atmospheric electricity.**—*M.R.*

7.9–260 551.594.12:551.510.535

Harvey, J. A. (*Electrical Eng. Dep., Univ. of Sydney*), **Movement of sporadic *E* ionization.** *Australian Journal of Physics*, Melbourne, 8(4):523–534, Dec. **1955.** 10 figs., table, 13 refs. **LC**—The horizontal movement of patches of day-time sporadic E ionization has been observed by using a system of spaced pulse transmitters and a central recorder. The directions of movement are mainly towards the north and west, with speeds mainly between 40 and 80 m/sec. These velocities differ in direction from the F region disturbances recorded at the same time and have only about half the speed. *Subject Headings:* **1. Sporadic E layer ionization Sporadic E movement.**—*Author's abstract.*

7.9–261 551.594.13

Barla, Mario, **Sulla correlazione trovata a Torino fra i vari parametri meteorologici e la conducibilità elettrica dell'aria.** [On the correlation found at Turin between various meteoro-

logical parameters and the electric conductivity of the air.] *Geofisica e Meteo logia*, Genoa, 3(3):96–98, May/June **1955.** 5 figs., 6 refs., eq. **DWB**—The origin of mospheric ions, the classification of ions large and small on the basis of their mobility and measurement of the electric conductivity of the atmosphere are discussed. The physi characteristics of the instrument used to measure electrical conductivity of the atmosphere described and the values measured at Turin are related to variability, wind velocity, relat humidity, air temperature, atmospheric pressure and cloudiness. These relationships shown on graphs. *Subject Headings:* **1. Electrical conductivity of air 2. Atmospheric ic 3. Turin, Italy.**—*I.L.D.*

7.9–262 551.594.14:546.42:5

Libby, W. F. (*U. S. Atomic Energy Commission*), **Radioactive fallout and radioact strontium.** *Science*, Wash., D. C., 123(3199):657–660, April 20, **1956. DLC**—Strontium- is biologically one of the most significant radioisotopes produced in nuclear explosions, a has a half-life of 28 years and will stay in the human body (bones) for a long time. The auth thoroughly explains the mechanisms whereby this isotope is produced, distributed over t globe, brought back to the earth's surface and taken in by soil, plants, animals, food produ and human beings. Critical amounts and biological effects are discussed. The auth concludes that "worldwide health hazards from the present rate of testing are insignifican Fallout within a few hundred miles of nuclear surface explosions constitutes a serious hazar but adequate precautions are being taken. *Subject Headings:* **1. Radioactive fallout 2. B logical effects of radioactivity.**—*G.T.*

7.9–263 551.594.

Gnam, Gunther and Wolf, Franz, **Quantitatives zur Elektrizitätserzeugung durch d Wasserfalleffekt auf Eis.** [Quantitative electric charges induced by water drops falling ice.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, Vienna, 9(2):232–24 **1956.** 3 figs., 3 tables, 19 refs. German, English and French summaries p. 232–233. **DWB** Electric charges produced by the Faraday-Sohncke effect were investigated in the laborator A 20 mg droplet at 20°C falling 75 cm on to an ice plate released a charge which varied fro $+3.6\times10^{-13}$ clb with ice at 0°C to -1.5×10^{-13} at −40°C, there being no charge and a d continuity at −25°C. The charge Q varied roughly with the kinetic energy W of the dr as given by mass and height of fall, the relation being 2.5×10^{-16} clb/erg W. Temperature the drop had no effect. Contamination with NH_4Cl decreased charge by up to 17%. *Subj Headings:* **1. Thundercloud electrification 2. Faraday-Sohncke effect.**—*C.E.P.B.*

7.9–264 551.594.2

Imianitov, I. M. and Chuvaev, A. P., **Ob osnovnom mekhanizme elektrizatsii grozovyl oblakov.** [Basic mechanism of electrification of thunder clouds.] *Meteorologiia i Gidrologi* Leningrad, No. 4:34–36, July/Aug. **1955.** table, 3 refs. **DWB**—Experiments were carri out to measure from airplanes the electric field potential at the beginning of naturally develo ing cumulus and during the stage when ice particles have formed within them. It was foun that the appearance of the ice phase in an aqueous cloud with sufficient water content a vertical currents produces a great increase in the electric field potential and the magnitude the charge is close in order of magnitude to the charge encountered in thunder clouds; t time of growth of the electric potential amounts to 10–30 min; and the growth of field potenti is associated with rainfall. It is concluded that intensive convection acting upon the natur course of development of clouds can alter the electrical condition. *Subject Headings:* **1. Thun dercloud electrification 2. Charge generation in thunderclouds.**—*I.L.D.*

7.9–265 551.594.2

Wolf, Franz, **Zum Anteil des Faraday-Sohncke-Effekts am Zustandekommen der Gewi terelektrizität.** [On the part of the Faraday-Sohncke effect in thunderstorm electricity *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, Vienna, 9(2):242–263, 195 4 figs., 30 refs., 6 eqs. German, English and French summaries p. 242–243. **DWB**—Th distribution of electricity in a thunderstorm as given by balloon ascents at Kew is discussed an existing theories of the origin of the charge are criticized as inadequate. The Faraday

ohncke effect is adduced in the form of collision of hailstones in an up-current with cloud roplets below 0°C. The charge after different times is calculated and the resulting accumulation of energy in a thunderstorm cell is found to be sufficient for the lightning of a moderate orm. For thunderstorms in the tropics which do not pass through the ice-phase some other echanism such as the Lenard-Simpson, must apply. *Subject Headings:* **1. Thundercloud ectrification 2. Faraday-Sohncke effect.**—*C.E.P.B.*

AURORAS

7.9–266 551.594.5:621.396

Gerson, N. C. (*U.S.A.F. Cambridge Res. Center, Geoph. Res. Directorate*), **A note on uroral interaction.** *Journal of Atmospheric and Terrestrial Physics*, London, 4(1/2):81–82, 953. **DWB**—Several explanations are possible for the modulation of radio frequencies when flected from auroral curtains. The probability is that the phenomenon is caused by a ppler effect. However, this effect would be 5 to 50 times as great as is actually observed, ssuming ionospheric winds of 250 km/hr. More probable results could be produced by ssuming that the reflections come from the sides, not the ends of the approaching stream of lar protons. A few quantitative values for the models are given in tables. *Subject Headings:* **Auroral effects on radio propagation 2. Radio wave reflection from auroras 3. Doppler fect.**—*M.R.*

7.9–267 551.594.5:551.510.535

Knecht, R. W. (*Nat'l. Bur. of Standards, Boulder, Colorado*), **Relationships between urora and sporadic-E echoes at Barrow, Alaska.** *Journal of Geophysical Research*, Wash., C., 61(1):59–69, March **1956.** 8 figs., 16 refs. **DLC**—During March 1951, a series of isual auroral observations were made simultaneously with ionospheric soundings at Barrow, laska (71° north, 156° west). Auroras were visible during 82% of the 379 observations, ade at least every 15 min. during the dark hours of 10 successive clear nights. Three nights e described in detail. Statistical results include (1) a strong tendency for sporadic-*E* (*Es*) choes at frequencies ≥ 7 Mc to be recorded when aurora was near the zenith; (2) a direct elationship between brightness of (inactive) aurora and the top frequency of *Es* echoes; 3) evidence for the correspondence of (oblique) *Es* echo ranges with estimated slant ranges of isible auroral forms. The observations lend support to the view that ionization in the imediate vicinity of visible auroral forms gives rise to ionospheric-type reflections at high requencies. *Subject Headings:* **1. Auroral-ionospheric relationships 2. Sporadic E layer choes 3. Barrow, Alaska.**—*Author's abstract.*

7.9–268 551.594.51:550.388

Alfvén, H., **Line currents in cosmic physics.** *Royal Society of London, Proceedings, er. A*, 233(1194):296–298, Dec. 29, **1955.** 4 refs., eq. **DWB**—A statement of the importance and complexity of magneto-hydrodynamics in gases, especially the ionosphere. xamples mentioned are the current along the auroral zone during a magnetic storm, the ay structure of the aurora, solar prominences and the electro-jet. *Subject Heading:* **1. Mageto-hydrodynamics.**—*C.E.P.B.*

7.9–269 551.594.52:551.557

Bless, R. C.; Gartlein, C. W. and Kimball, D. S. (*all, Cornell Univ., Physics Dept., Ithaca, N. Y.*), **East-west motions in the aurora.** *Astrophysical Journal*, Chicago, 122(1):205–206, uly **1955.** 6 refs. **DWB, DLC**—Eastward or westward motion of auroras was noted in terature as early as 1831 (Albany) and 1837 (St. Lawrence), and in 1882–83 at least 247 nstances of motion were recorded by Carlheim-Gyllensköld (Cape Thordsen) showing almost o dependence of motion on time. Cornell-National Geographic studies made since 1939 Ithaca, N. Y.) show drift in 57 out of 120 displays: 45 showing westward and 22 eastward rift, while 39 showed complex motions (alternating at short intervals). On 8 instances teady motions reversed during night (10 p.m.–2 a.m.). Steady motions are usually westward arly and eastward late at night, and either or both in middle of night. Random motions ay occur any time but usually after an arc dissolves into rays. *Subject Headings:* **1. East-west uroral motion 2. Auroral drift 3. Cape Thordsen, Spitsbergen.**—*M.R.*

RADIO METEOROLOGY

7.9–270 551.594.7:551.510.52:621.396.02

Campen, Charles F. and Cole, Allen E., **Tropospheric variations of refractive index microwave frequencies.** *U. S. Air Force. Cambridge Research Center, Air Force Surveys Geophysics*, No. 79, Oct. **1955.** 76 p. 46 figs., 4 tables, 44 refs., 13+19 eqs. **DWB, DLC** The effect of gross variations in tropospheric refractive index on the accuracy of radio guidan systems for high altitude vehicles is discussed. Refractive index profiles prepared fr radiosonde observations taken for three summer and three winter days at stations in differe geographical locations in North America and representing various types of air masses a compared with a standard index of refraction curve derived from the ICAO Standard Atm sphere. Variations of the index at the ground, at 20 kilofeet, the average of the index fr the ground to 25 kilofeet and the differences between these and the standard index are give It was found that the index varied by 135 N units at the ground, by 21 N units at 20 kilofe and that the average index from the ground to 25 kilofeet varied by 35 N units. Wh categorized by air mass type, by location, or by time intervals, variations within any of the categories were much smaller. Differences between the computed indices and the Standa Index ranged from +71 to −64 N units at the ground, from +17 to −4 N units at 20 kilofe The differences between the averages of the index from the ground to 25 kilofeet and the avera of the standard index ranged from +23 to −12 N units. Correlation of these average ind data with surface index data was found to be very good. A correlation coefficient of 0. was obtained. For the scattergram a regression curve was drawn which showed a standa estimate of error of only 5 N units. Sample calculations of refraction errors were made whi show use of the index data for correction of these errors. *Subject Headings:* **1. Tropospher refraction 2. Microwave propagation.**—*Authors' abstract.*

PART II. ANNOTATED BIBLIOGRAPHY ON TROPICAL CYCLONES, HURRICANES AND TYPHOONS

By: *Wilhelm Nupen* and *Malcolm Rigby*

INTRODUCTION

The cyclonic nature of hurricanes and typhoons has been common knowledge among seamen nd geographers since the 17th century, and FRANKLIN's, DAMPIER's and LANGFORD's written mmentaries on the nature and movement of storms are too well known to need repetition. The st major work on winds and cyclonic storms is that of JAMES CAPPER (1801) who gave detailed idence of the rotary nature of storms in the East India coastal region (see 7I--190 below). But oof, which would stand up before the scientific and nautical world, waited for REDFIELD and OVE (1821–31); and an explanation of the dynamical and thermodynamical mechanism which uses and maintains hurricanes for ESPY (1841), TRACY (1843), FERREL (1889) and VIÑES (1895). nce then a great deal of detailed knowledge of the structure and behavior of these storms has en gained, but progress is still as exasperatingly slow and faltering as it was 100 years ago when EDFIELD, REID, PIDDINGTON, THOM, ESPY, MAURY and BLODGET were wallowing in a sea of in- rmation yet deploring the lack of real knowledge of the causes, dynamics and behavior which would d to the ability to accurately predict and thus avoid or prevent loss of life and property in rricanes.

By 1855 POËY, a Cuban bibliographer-meteorologist (located for years in Havana) had mpiled a list of 400 hurricanes and a bibliography of several hundred references to the literature n tropical cyclones, and by 1866 this bibliography had grown to over 1000 references to scientific d popular accounts relative to the subject (7I–9 and –13). By 1956 such a bibliography would mprise 5000 to 10,000 references if every account of a single typhoon, hurricane or tropical cyclone ywhere in the world were included. A rough compilation of the readily available references to ientific and semiscientific literature made by our staff early this year amounted to over 1,500 ems. Hence it can be seen that a bibliography on tropical cyclones, no matter how selective, uld not be published in a single issue of *MAB*.

It is therefore our intention to divide the subject into 6 separate bibliographies, 3 of which will e published consecutively in this and the two succeeding issues of *MAB*. These will comprise: about 200 items of historical, general or theoretical interest, giving the user (through bibliograph- al references included in the various items) a lead to nearly all the important literature of the past ntury and a half; 2) about 200 references to literature on the practical aspects of hurricanes, rricane floods or surges, and defense, insurance, warnings, etc. against these storms; 3) about 00 references to more highly specialized literature on the theory and analysis of tropical cyclones.

The remaining 3 bibliographies (not yet scheduled) will cover: 4) important accounts or analyses *single hurricanes* in the Atlantic area; 5) *single typhoons* in the West Pacific and 6) *tropical cyclones* other parts of the world.

It would be possible, then (in a year or two), to integrate the 6 bibliographies, bring them up to te by adding literature that has accumulated (at an accelerated rate) in the meantime, and publish a monograph (with an outline, subject, author and geographic index) the 1200–1500 items thus mpiled.

Work on these bibliographies has been made possible through support by the U. S. Weather ureau, the National Hurricane Research Project and its Director, Mr. R. H. Simpson and the Air orce Cambridge Research Center. We wish also to express appreciation for the technical assistance ndered by Dr. H. Arakawa of the Meteorological Research Institute, Tokyo, Dr. C. E. P. Brooks Ferring, Sussex, England, Harris P. Kramer formerly of MAB, and Mary L. Rice, Winifred hraitle and Geza Thuronyi of our staff who did a great deal of work on the bibliography.

The following subject outline is not by any means exhaustive—it merely gives an indication the scope of the material included, and a few references for each subject. It is hoped that readers ill call our attention to any *major* works which have been omitted; remembering, however, that any *important* works have been reserved for the 2nd and 3rd installments. Inclusion in this sue of a few recent and hitherto unpublished items of less than major importance has been justified the grounds that they would normally appear in the Current Abstracts section (Part I) of this sue, so are placed in Part II to avoid repetition.

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1828

7I–1 551.51

Dove, H. W., **Ueber barometrische Minima.** [Barometric minima.] *Annalen der Physik u Chemie,* Leipzig, 13:596–613, **1828.** 7 figs. (see plate 7 at end of Vol. 13). **DLC**—In this volu of **Poggendorf's Annalen,** Dove published 4 fundamental papers, one on the relation of hydromete to changes of pressure and temperature; one on thunderstorms; one on the general circulation; a the last and most famous, on the rotary winds in barometric minima. He sets forth, on the basis carefully analyzed and tabulated reports from Europe and America, the principle that low pressu areas are cyclones that form on the boundary between two air currents, one from the north or nort east, and one from the south or southwest, and that they move along with the southerly flow where anticyclones move with the northerly flow. Several schematic diagrams are presented to show t general principle or mechanism involved, and to show specific examples of the storms (called hur canes) of Dec. 24, 1821, and Feb. 2, 1823, and the relation of cyclonic and local storm winds to t large-scale circulation and average pressure profile. Feathered arrows almost identical with tho used today on synoptic charts are used to depict winds. The stepwise evolution of the vort system on the discontinuity between the "climatic" flow pattern is shown by means of 7 figure Whereas this model does not specifically apply to the genesis of pure "tropical" hurricanes, it w the first theoretical demonstration in scientific literature of the cyclonic and forward propagati nature of low pressure areas, and was arrived at independently of Redfield's earlier deductio (which were not published until over 2 years later). Dove states that every seaman will testify th storms are usually whirlwinds, but none had heretofore taken the trouble to demonstrate it by mea of synoptic observations and charts. Finally, he makes the amazing deduction that cyclones ma occur in families so that one vortex may begin before the previous one has completed its full cyc (of wind and pressure changes). *Subject Headings:* **1. Cyclone theory 2. Law of storms.**—*M.R.*

1831

7I–2 551.515

Redfield, W. C., **Remarks on the prevailing storms of the Atlantic coast of the North America States.** *American Journal of Science,* 20:17–51, **1831.** chart (fold.). Also his: **Observations the hurricanes and storms of the West Indies and the Coast of the United States.** *Ibid.,* 25:114–12 **1834.** Also his: **On the evidence of certain phenomena in tides and meteorology.** *Ibid.,* 28:310–31 July **1835.** Also editorial: **Redfield's law of storms: notice of Col. Reid's work on hurricane** *Ibid.,* 35:182–184, **1838. DLC**—The first and most famous of Redfield's articles on the structu and movement of hurricanes was submitted for publication late in 1830, after a decade of patie and intelligent observation compilation and analysis of every available shred of data on the storms, from their first indications in the West Indies to their disappearance from the scene in t Newfoundland area. A remarkable chart shows the paths and area of effective winds of two hur canes of 1830. This chart bears a striking resemblance to charts of a century later, for the cyclon size, structure and position on Aug. 17, 1830 is represented by a series of concentric circles, wi feathered arrows showing observed winds in the affected area, and the prevailing air flow supe imposed by means of fine parallel lines with arrows showing direction of winds in this planeta current in which the gyratory storm is embedded. The details of observed facts and conclusio are presented in a loose, narrative style, but a succinct summary of the facts and conclusions found in the 1834 paper, which is a reprint of the condensed article written by Redfield for the 12 edition of Blunt's **Coast Pilot.** The 12 points set forth include the highly controversial theo that these storms originate in the doldrums or trade wind belt between 12° and 20°N, move in broad curve to the NW until they reach a latitude of about 30°N, whence they recurve to the N and are carried by the general westerly current as giant eddies in a stream. Size, speed of win rate of movement and progressive expansion in different stages of their life history; duration, dept forward inclination, calm center, upper cloud and steering movements, frictional and orograph

ects; thunderstorm activity, and swells which outrun the storms are treated with amazing per- ective and, finally, several rules for pilots of ships to follow in evading the worst winds and seas, e presented. The later articles are devoted to presentation and analysis of data on later hurricanes, d to defense of his theory that pressure is low in the center on account of centrifugal force not e to thermal effects as Espy had maintained, and that revolving motion was initiated by the rnal and rotatory effects of the earth on the trade winds, and was maintained by a cog-wheel ocess. He correctly perceived the erratic or spiral course of the center of some hurricanes. *Subject eadings:* **1. Hurricane theory 2. Law of storms 3. Atlantic Coast hurricanes.**—*M.R.*

1841

7I–3 551.515.2

Espy, James Pollard, **The philosophy of storms.** Boston, Little and Brown, **1841.** 552 p. s., tables, foot-refs., p. 188–293, **Examination of Reid's, Piddington's, and Loomis's storms. LC**—In the fifth section (p. 188–293) of this classic work, the author presents every shred of servational material compiled by Redfield, Reid, Piddington and Loomis in their studies of clonic storms (hurricanes and typhoons) and fresh evidence from log books, newspapers, etc. to ute the claims of the above authors that these storms are rotatory. He correctly interprets the ermodynamic forces of inflow, upward motion condensation due to expansion, outflow at the top d fall of pressure in the center due to heat added by condensation as well as horizontal divergence the top, and the effect of the steering current, but persistently denies the possibility that the orms revolve and uses seemingly logical arguments to show that the winds flow straight toward e center of a hurricane (or tornado), while admitting that his other principles would apply even the storms were rotary, and acknowledging Redfield's great discovery of the "translation of orms in space and their continuity in time." *Subject Headings:* **1. Hurricane theory 2. Hurricane counts 3. Espy's theory 4. Redfield's theory.**—*M.R.*

1842

7I–4 551.515.2(729,74/75)

Redfield, W. C., **Observations on the storm of Dec. 15, 1839.** *American Journal of Science*, :112–119, **1842.** 2 figs., table. Also his: **On three several hurricanes of the American seas, d their relation to the Northers, so called, of the Gulf of Mexico and the Bay of Honduras, with arts illustrating the same.** *Ibid.*, Ser. 2, 51:1–16; 153–169; 333–367; and 52:162–187, 311–334, **46.** figs., charts (fold.), numerous tables, refs. **DLC**—Following up the technique for represent- g the rotary nature of a hurricane which was presented on the chart accompanying his 1831 article *ee* 7I–2), the author presents in the 1842 article two synoptic charts, one for near sunset, and one r near noon of Dec. 15, 1839, showing the winds in New England accompanying this hurricane relation to concentric lines spaced evenly about the storm center. The winds are seen to incline ghtly inward, and in the subsequent articles (1846) the same inward inclination is noted. The thor admitted that his original intent (1831) was to draw spiral lines, but that the concentric ttern was intended as a compromise for the sake of ease in drafting. He also suggests an occa- onal eccentric wind field and upward motion in the storm center. In both the 1842 and 1846 ticles the author presents extremely detailed transcriptions of ships logs and other data on many rricanes and similar cyclonic storms, carefully compiled tables of ships and land reports, and (in 46 articles) 23, 3-hourly synoptic wind charts, on concentric models as described above, for a day period (for the Cuban Hurricane of Oct. 4–7, 1844 as it moved from the Gulf to Nova Scotia) d, in addition, pressure profiles for many places and a chart showing tracks of all West Indian d Caribbean hurricanes affecting the Atlantic Coast of the United States from 1804–1842. *Subject eadings:* **1. Hurricane structure 2. Hurricane case histories 3. West Indies 4. Atlantic Coast United States.**—*M.R.*

1845

-5 551.515.2(267)

Thom, Alexander, **Inquiry into the nature and course of storms in the Indian Ocean south of e equator (with a view of discovering their origin, extent, rotatory character, rate and direction progression [etc.]).** London, Smith, Elder & Co., **1845.** 351 p. 19 charts (1 fold.), tables, ot-refs. **DLC**—The author, an army surgeon stationed at Mauritius, was inspired to study and rite the account of the great Rodriguez Hurricane of 1843 and other devastating tropical cyclones that part of the Indian Ocean and to publish his notes in book form, even though his transfer to dia and professional duties did not permit him to complete nor to refine his study. He attributes e hurricanes to the unequal retreat of the SE trades and advance of the opposing westerly monsoon, using storms and cyclones along the boundary or calm zone between, as autumn advances in Jan.– arch in the Southern Hemisphere. He analyzes in great detail, in the same manner as Redfield, ove and Reid, the numerous reports he has collected for different positions of various storms.

Chapters are also devoted to a general discussion of geographical, statistical and climatic aspe of these cyclones and to a review of the theories of the authors who worked on the hurricanes of West Indies and China Seas, and to practical rules for use by seamen in avoiding or minimiz damage due to hurricanes. The remarkable thing about these early works is the extreme de with which the authors have transcribed pertinent data from numerous log books and have inte gently analyzed and synthesized the findings. A good subject index is included. *Subject Headin* **1. Hurricanes in the Indian Ocean 2. Rodriguez Hurricane (1843) 3. South Indian Ocean.**—*M.*

1850

7I–6 551.51

Reid, William, **An attempt to develop the law of storms by means of facts, arranged accordi to place and time; and hence to point out a cause for the variable winds, with the view to practi use in navigation.** 3rd ed. London, John Weale, **1850.** 530 p. numerous figs., charts (fol tables. **DWB**—This is the first systematic presentation of all the known facts about trop cyclones. The history of the discovery of the theory of cyclonic storms from FRANKLIN (*ca* 17 to COL. JAMES CAPPER (1801), REDFIELD (1831) and the author's own work, comprises the f chapter. Then in successive chapters he thoroughly analyzes REDFIELD's **Hurricanes** (1821 a 1830), the Barbados hurricanes (1831 and 1835), hurricanes of 1837 (5 in succession), South Hemisphere (Pacific, Mauritius and India), typhoons of the China Sea and Bay of Bengal hurrica hurricanes of 1780, storms in high latitudes and Mediterranean, measurement of wind force, wa spouts and dust devils and, finally, tornadoes and rules for navigation during hurricanes and explanation of swell emanating from storms. The analyses include numerous original or redra fold-in charts of the structure and path of the greatest hurricanes, and a composite graph showi the diurnal course of different elements for a 2-week period (1837), including wind speed from newly developed anemometer, wind direction, pressure, temperature, humidity and precipitati *Subject Headings:* **1. Hurricanes 2. Law of storms.**—*M.R.*

1852

7I–7 551.515

Piddington, Henry (*Pres. Marine Courts, Calcutta*), **Conversations about hurricanes for t use of plain sailors.** London, Smith, Elder & Co., **1852.** 109 p. diagrs. **DLC**—The author h framed in a fictional conversational style, the basic knowledge of tropical cyclones, their structu tracks and behavior of atmosphere and sea in their vicinity, together with practical aids to navigati in tropical cyclones. Two celluloid horn cards with compass points and cyclone (wind) points a attached for use in hurricane navigation in the Northern and Southern Hemispheres, respective (for finding direction of storm center). As proof of the law of storms, instances are cited and trac shown of vessels which circled or corkscrewed for days when caught in a cyclone. Rules are giv for heaving to, and thus avoiding disaster. Statistics on shipwrecks are given. The use of t term cyclone which the author introduced, (instead of hurricane) is justified as being more specif since a hurricane can be a straight gale of great force as well as a rotating wind. *Subject Headin* **1. Tropical cyclones 2. Law of storms 3. Horn cards.**—*M.R.*

1854

7I–8 551.515.2 (26

Redfield, William C., **Cape Verde and Hatteras hurricane, of Aug.–Sept. 1853, with a hurrica chart and notices of various storms in the Atlantic and Pacific Oceans north of the equator.** Ne Haven, B. L. Hamlen, **1854.** 32 p. figs., chart (fold.), foot-refs. **DLC**—Reports from more tha 100 ships in the North Atlantic are cited and analyzed to show the conditions attending the fir hurricane of Sept. 1853—a remarkable storm in that it was traced from Cape Verde to Cape Hatter and thence recurving up toward the Scotland-Iceland region. A chart shows path of this a numerous other hurricanes of the Atlantic and Caribbean, and text gives notes on many oth storms together with conclusions as to circulation in hurricanes (and other features) and the causes. Conclusion is that dynamic theory needs revision. *Subject Headings:* **1. Hurricane not 2. Cape Verde-Hatteras Hurricane (Sept. 1853) 3. North Atlantic.**—*M.R.*

1855

7I–9 551.5.5.2 :0

Poëy y Aguirre, Andrès, **A chronological table comprising 400 cyclonic hurricanes which ha occurred in the West Indies and in the North Atlantic within 362 years, from 1493 to 1855, with bibliographical list of 450 authors, books, etc. and periodicals where some interesting accoun may be found, especially on the West and East Indian hurricanes.** *Royal Geographic Societ London, Journal,* 25:291–328, **1855.** foot-refs. **DLC**—Review in *American Journal of Scienc*

2, 22:452, 1856. DLC—Also translation into French: **Table chronologique de quatre cents ones que ont sevi dans les Indes Occidentales et dans l'Océan Atlantique Nord pendant un rvalle de 362 années, depuis 1493 jusqu'en 1855.** Paris, Paul Dupont, 1862. 49 p. foot-refs. ead of t-p: *Dépot des Cartes et Plans de la Marine*, No. 348. DLC—This remarkable list of icanes contains dates, location and reference to authorities or source of information. Many taken from KEITH JOHNSTON's atlas containing a list of 127 hurricanes from 1493–1847, from OMBURGK's tables (127) and from REDFIELD's manuscript meteorological journal from which llowed POËY to copy additional entries. Comments on the storms are limited to foot-notes. bibliography is excellent but not as complete or accurate as the 1866 bibliography (*see* 7I–13). *ject Headings:* **1. Hurricane chronologies 2. Hurricane bibliographies 3. West Indies 4. North ntic.**—*M.R.*

1857

7I–10 551.515.2(75,76)

Blodget, Lorin, **General winter storms of the United States; including hurricanes, etc.** (In **Climatology of the United States. . . .** Philadelphia, J. B. Lippincott & Co., **1857.** p. 373– charts (fold.).) DWB—The well-known author of this outstanding pioneer "Climatology" s a pessimistic view of the regularity of atmospheric disturbances and the likelihood of their being predictable in any but the most general way. Their behavior is too erratic and their es too complex to conform to theoretical models. He doubts if the direction and "degree of ence" of winds will ever be predictable 2 or 3 hours in advance. However, he thinks it would be ne greatest service to agricultural and shipping interests to have previous telegraphic knowledge the existence and movement of tropical cyclones, and he states that the knowledge of "probable tion" of hurricanes is of considerable consequence and value, whether the theory of causation is licable to the case or not. He inclines to the Espy theory of centripetal action and to the storm rgy being proportional to the rate of release of latent heat during condensation and precipitation. eral hurricanes of the years 1853–56 are described in detail, and a chronological list of over 60 icanes of the Atlantic and Gulf Coast from 1700–1856, with details of their character and result- damage, and authority, included. *Subject Headings:* **1. Hurricane theories 2. Hurricane nologies 3. South Atlantic States 4. Gulf Coast.**—*M.R.*

7I–11 551.515

*Dove, Heinrich Wilhelm. **Über das Gesetz der Stürme.** [On the law of storms.] Berlin, trich Reimer, **1857.** 115 p. figs., tables, map (fold.), foot-refs., refs. in text. Special reprint n his "**Klimatologische Beiträge.**" Also his: **The law of storms, considered in connection with ordinary movements of the atmosphere.** 2nd ed. rev. and enl. Trans. by ROBERT H. SCOTT. don, Longman, Green & Roberts, **1862.** 324 p. Also his: **La loi des tempêtes.** 2nd ed. trans. A. LE GRAS. Paris, Paul Dupont, **1864.** 309 p. Also his: **Das Gesetz der Stürme** 3rd ed. Berlin, Dietrich Reimer, **1866.** 346 p. DWB—The first edition of this book was translated English and published in **Meteorological Papers of the Board of Trade** (*see* 6B–1, Feb. 1955, *B*). The second edition was greatly revised and enlarged and even further enlarged in the lish translation by adding data at the request of the author. The book takes up in orderly ion the nature of winds and rotatory storms, the influence of the earth's rotation, the permanent ds (trades and counter-trades), seasonal winds (monsoons, etc.), "the changeable winds" in the thern and Southern Hemispheres and variation in meteorological elements in respect to cyclones . finally, the law of storms or hurricanes and practical rules connected therewith. DOVE, by time, had greatly elaborated on his idea of cyclones forming at the boundary between a polar an equatorial current and being borne along the equatorial current, and included numerous mples and charts of tropical cyclone formation and movement in the trade wind zones of the ral oceans, tracks of hurricanes and typhoons, Mauritius and Bay of Bengal storms, etc.). s interesting to note his continual reference to the contrasting properties of the polar and equa- al currents: the one cold, dry, dense and in general clear; the latter warm moist, light, and cloudy rainy, and tending to override the polar current, whereas the polar current usually remains close he ground and comes on with greater suddenness. He also speaks of source regions, convergence divergence. *Subject Headings:* **1. Law of storms 2. Cyclone theory 3. Air mass theory ranslations I. Scott, Robert H.** (*trans.*) **II. Le Gras, A.** (*trans.*).—*M.R.*

1861

7I–12 551.515.2 551.46(02)

Maury, M. F. (*Nat. Observatory, Wash., D. C.*). **Storms, hurricanes and typhoons.** (In his **rsical geography of the sea and its meteorology.** 8th ed. rev. & enl. N. Y., Harper, **1861.** 14–432. figs., tables, foot-refs., plate 5, following p. 474.) DLC—In this chapter, the author usses storm frequency at sea throughout the world (based on ships' reports), typhoons, Mauritius ricanes, West India hurricanes; the cyclone theory of REDFIELD, REID, THOM and PIDDINGTON;

Espy's theory of ascending motion in storms, etc.; Dove's "Law of Rotation"; calculation of w speed vs. pressure gradient from Bernoulli's formula; effects of distance (gradient) and fric on reducing theoretical wind speed as calculated from pressure difference; importance of sync network over America, Europe and the Atlantic for predicting storms at sea; wind changes cyclone depending on location of ship; rainfall in a cyclone depending on speed of its movement finally, the author's theory that the hurricane is neither a perfect vortex (maintained by centrif force) as claimed by cyclonologists, nor a trough with air moving directly in and upward and m tained by latent heat and divergence, but a spiral system, with possibly several vortexes, maintai by both centrifugal and thermodynamic forces, and that there is an upper limit on the pos size of a revolving system. Many examples are given and a table presented showing the aver number of cyclones or hurricanes in different months of the year in the West Indies, Indian Oc China Sea, Bay of Bengal and Mauritius region (from Birt's **Handbook of Storms**), giving an e gerated but seasonally representative picture of the number of tropical cyclones in various p of the world. (*See also* 5A–1, Jan. 1954, *MAB.*) *Subject Headings:* **1. Tropical cyclones 2. Oce ography textbooks.**—*M.R.*

1866

7I–13 551.515.2:

†Poëy y Aguirre, Andrès, **Bibliographie cyclonique: catalogue comprenant 1,008 ouvrag brochures et écrits qui ont paru jusqu'à ce jour sur les ouragans et les tempêtes cycloniques.** [clone bibliography: a catalogue of 1,008 works, brochures, and writings which have appeared u now on hurricanes and cyclonic storms.] 2nd ed. corrected and enl. Paris, Paul Dupont, 18 96 p. On t-p: "Extrait des Annales Hydrographiques 1865." **DLC**—In 1855 the author publis a catalog of 400 West Indian hurricanes which had occurred since 1493 in the *Royal Geograph Society, London, Journal* (*see* 7I–9), followed by a bibliography of 44 works on Tropical Cyclo This was translated into French by Le Gras and published in 1862. This later (1866) bibliogra contains additions and corrections accumulated over the 10 intervening years, and references hurricanes anywhere on the earth, plus citations on tornadoes and other cyclonic storms. Ent are arranged alphabetically by author and chronologically under the author's name. Bibliogra methods are explained in the Introduction. *Subject Heading:* **1. Hurricane bibliographies.**—*M.*

1868

7I–14 551.515 551.5(

Loomis, Elias, **Treatise on meteorology.** N. Y., Harper & Brothers, **1868.** 305 p. 36 tab 98 figs., bibliog. p. 296–299. **Theory and laws of storms** [and] **Cyclones,** p. 136–151. figs. (58–6 **DLC**—In contrast to Davis's (*see* 7I–19) eloquent and philosophical treatment of the theory cyclones or hurricanes, Loomis's textbook contains terse and orderly paragraphs covering e successive point in the development of the theory, and several examples, illustrated by sim schematic drawings and one synoptic chart. Loomis admits the dual influence of earth's rotat and centrifugal force in producing lowering of pressure in a cyclone—the centrifugal force be far more important in tropical cyclones and earth's rotation most important in extratropical cyclo and condensation being necessary for maintaining the system (in tropical storms) over a long t jectory. *Subject Headings:* **1. Cyclones 2. Law of storms 3. Meteorology textbooks.**—*M.R.*

1875

7I–15 551.51

Hann, J. von, **Über die Beziehungen zwischen den Luftdruckdifferenzen und der Windges windigkeit nach den Theorien von Ferrel und Colding.** [On the relation between air press variations and the wind velocity according to the theories of Ferrel and Colding.] *Zeitschrift Meteorologie,* 10(6):81 88, and 10(7):97–106, **1875. DLC**—Hann, although previously supporti the purely mechanical theory of cyclones (of Dove, Redfield *et al.*), admits the partial influence the thermodynamic factors (Espy's theory) in reduction of pressure in a cyclone, which he calls "Physical" theory, but he cannot account for some of the greatest depressions on this basis alo He thoroughly reviews the theory of Ferrel (*see* 7I–16), giving the basic equations (with comme and explanation), as well as applications to gradient flow and forward propagation of both tropi and extratropical cyclones in various latitudes. *Subject Headings:* **1. Cyclone theory 2 Tropi cyclone dynamics.**—*M.R.*

1889

7I–16 551.51

†Ferrel, William, **A popular treatise on the winds.** N. Y., Wiley, **1889.** 505 p. figs., tab 91 refs. **Cyclones,** p. 226–346. **DLC**—On p. 226–315 of this classical text will be found one of most lucid and advanced treatments ever made on the entire subject of tropical cyclone theory fr

ynamic and thermodynamic point of view, with a description of the structure, vertical circulation, mperature distribution, clouds, circulation, frequency, pressure distribution and changes, calms, ; with mathematical and graphical models and comparison with observations of actual conditions several cyclones, tabulated and compared with theory. The St. Thomas Hurricane of Aug. 2, 7; Manila Typhoon of Nov. 5, 1882; Cienfuegos, Sept. 5, 1882 are given special treatment. Rain l cloud areas, resultant winds and progressive movement, high level winds (Mt. Washington) l the "eye of the storm" are also discussed at some length. *Subject Headings:* **1. Cyclone theory Tropical cyclone dynamics 3. St Thomas Hurricane (Aug. 1837) 4. Cienfuegos Hurricane ept. 1882) 5. Manila Typhoon (Nov. 1882).**—*M.R.*

1891

7I–17 551.515.2(267.8)

*Dallas, William Liscombe, **Arabian Sea: an inquiry into the nature and course of storms in the bian Sea and a catalogue and brief history of all recorded cyclones in that sea from 1648 to 1889.** *lia. Meteorological Dept., Cyclone Memoirs*, No. 4:301–424, **1891.** 16 plates, tables, refs. **DWB,** —All the more important information hitherto published on storms in the Arabian Sea is col- ted and arranged in two parts: one giving details of each storm; the other, distribution and vements of storms according to months and seasons and opinions of meteorologists of the past cyclonology in the Arabian Sea. Storm charts are presented and conclusions as to the law of urrence of storms and their tracks at different seasons are stated. (*Same item as* 2F–12, June 1, *MAB.*) *Subject Headings:* **1. Tropical cyclones in Arabian Sea 2. Arabian Sea.**—*H. P. amer.*

1893

7I–18 551.515.2(265)

Knipping, E., **Die tropischen Orkane der Südsee zwischen Australien und den Paumotuinseln.** he tropical cyclone of the South Sea between Australia and the Paumoto Island.] *Aus dem chiv der Deutschen Seewarte*, Hamburg, 16(1), **1893.** 28 p. map, tables. **NNA**—Area includes ith Pacific from Anchala west to the Paumoto Islands 140°W and 10–30°S. Characteristics of ricanes in this region, attending meteorological conditions, distribution and frequency, tracks, vement, etc. are discussed and list and observations of occurrences since 1789 are included. ps show frequencies in 5° squares, and tracks and seasons of various storms. *Subject Headings:* **Tropical cyclones in Pacific Ocean 2. South Pacific.**—*H.P. Kramer.*

1894

7I–19 551.515.2

Davis, William Morris, **Elementary meteorology.** Boston, Ginn & Co., **1894.** 355 p. 106 ., tables. **DWB, DLC**—On p. 184–208 (**Cyclonic storms and winds**), the author treats, in his quent yet adequately technical style (gained from studying under Ferrel), the many aspects of pical cyclone structure, origin, geographical distribution, seasonal frequency in various parts he earth, effect of earth's rotation in the Northern and Southern Hemispheres, latent heat from nfall, the "eye" of the storm, relation to general circulation, reason for nonexistence in S. Atlantic, . He attributes their origin to the convectional action in the doldrums at that season and in se areas where the belt of calms is farthest from the equator so that rotation of the earth is suffi- nt to set up a cyclonic rather than a straight inflow. The doldrums never reach far enough south he equator in the Atlantic to achieve that condition. He cautioned the student (p. 206) against emorizing" the convective theory as if it were gospel just because it satisfied all the requirements a theoretical explanation, for it had (at that time) never been demonstrated by aerological meas- ments and might prove completely untenable when more data became available. Yet he be- ed that it was the best working theory. *Subject Headings:* **1. Tropical cyclones 2. Cyclone theory Meteorology textbooks.**—*M.R.*

1895

7I–20 551.515.2(729)

Viñes, Benito (*Dir. Magnetic and Met. Obs., Colegio de Belen, Havana*), **Investigaciones relativas circulación y traslación ciclónica en los huracanes de las Antillas.** [Investigation of the cyclonic culation and the translatory movement of West Indian hurricanes.] Havana, Imp. del Avisador mercial, **1895.** 79 p. port., table, foot-refs. **DLC.** Also English translation by C. Finley, ued as *U. S. Weather Bureau, W.B.*, No. 168, **1898** [special extract from *W.B. Bulletin*, No. 11, 4]. 34 p. table, foot-refs. **DWB.** Also his: **Apuntes relativos a los huracanes de las Antillas setiembre y octubre de 1875 y 1876.** [Notes on West Indian hurricanes of Sept. and Oct. of 5 and 1876.] Havana, E. Iris, **1877.** 256 p. map (fold.), foot-refs. **DLC.** Also: Translation his summary of **Apuntes . . .** issued by U. S. Hydrographic Office, **1885** as **Practical hints in**

regard to West Indian hurricanes. DWB—In the 1877 volume the author presents detailed obser tions of pressure, wind, clouds, rainfall, tides and floods attending the hurricanes of Sept. and 1875 and 1876 which affected Cuba. These observations of surface and upper air conditions analyzed and conclusions presented as to the origin, development, movement, recurvature, s structure, intensity and other features such as electrical and optical phenomena, hurricane sv the eye of the storm, cirrus, middle and low cloud motion with respect to circulation and movem of storm, etc., etc. He comes to the conclusion, emphasized in the 1895 and 1898 (English) versi that the surface winds converge considerably, the low or intermediate clouds follow the class concentric pattern and the high clouds diverge, though these conditions vary with size, de intensity, rate of movement or quarter of the individual cyclone. This and other profound c clusions are formulated into "laws" in the later editions, and these laws relate in a quantita fashion to all of the aspects of a hurricane considered from a 3-dimensional standpoint, not me from a geographical or thermodynamic point-of-view as had been the case with previous auth The conclusions of previous authors however, are duly weighed and incorporated into the "la wherever the author believes them valid in the light of his detailed cloud observations. Pract matters, such as avoidance of wind, wave, swell and flood damage are given considerable place in th outstanding works. *Subject Headings:* **1. Hurricane structure 2. Hurricane forecasting 3. Cu I. Finley, C.** (*trans.*).—*M.R.*

1897

7I–21 551.515.2 (9

†§*Algué, José (*Dir. Philippine Weather Bureau*), **Baguios ó ciclones Filipinos: estudio téori práctico.** [Baguios or Philippine cyclones: a theoretical-practical study.] pub. Manila, **18** 307 p. figs., tables. **DWB.** Also his: **Cyclones aux Philippines et dans les mers de Chine.** [clones in the Philippines and in the China Sea.] Paris, **1900.** 253 p. **DWB.** Also his: **Cyclo of the Far East.** 2d ed. rev. Manila, Bureau of Public Printing, **1904.** 283 p. 54 plates, tab refs. **DLC.** And his: **Baguios o tifones de 1894; estudio de los mismos, seguido de algunas c sideraciones generales acerca de los caracteres de estos meteoros en el extremo Oriente.** [Bagu or typhoons of 1894: their study, with some general considerations on the characteristics of th meteors in the Far East.] Manila, **1895.** 180 p. figs., tables. **NNA**—The Spanish edit published in 1897 (translated into German and English) (*see* 7I–24) was confined mainly to Philippines and vicinity. The second English edition contains many additions and revisions include rules for navigating in and near typhoons, a new classification of cyclones, regional a seasonal frequency data, relation of microseisms to position and movement of typhoons, unusua low pressures in typhoons, and the relation of cirrus movement to cyclone tracks. The 32 chapt take up in detail the nature, origin, structure, pressure, rain and cloud areas, movement, tra and zones, frequency, classification, forecasting aids (clouds, wind, pressure, swell, microseisms, et case histories (9 storms, 1882–97), anomalies and sailing rules. This is one of the major contributi to meteorology. A glossary, index, numerous original charts, records, citations and tables add the value of the work. *Subject Headings:* **1. Typhoon monographs 2. Typhoon case histor 3. Boguios, Philippine Islands.**—*M.R.*

7I–22 551.515.2 :551.50

§Bigelow, Frank Hagan (*U. S. W. B., Wash., D. C.*), **Storms, storm tracks and weather fo casting.** *U. S. Weather Bureau, Bulletin,* No. 20, **1897.** 87 p. numerous figs. and tables. **DW** In BIGELOW's practical handbook for analysis of maps and forecasting storms in the United Sta on a month-by-month basis, the nature, origin, development, movement and forecasting of W Indian hurricanes is treated under the month of Sept. on p. 18–21, and under Oct. on p. 24– It is the opinion of the writer, as gained from studying 7 years of weather maps, that hurrica will recurve up the Atlantic Coast if the blocking High moves out to sea leaving a trough behi but will continue into the Gulf of Mexico if the High remains persistently on the coast. The ori of the cyclones is thought to be connected with the encroachment of the sub-tropical anticyclo on the belt of doldrums at the season of the year when the latter have reached their farthest no position and the sun is starting to move south carrying the anticyclone with it, but at a differen rate in different longitudes. BIGELOW attributes all cyclonic development and propagation movements of *anticyclones*, which he states are carried by the general planetary currents (rather t the alternate theory that the *cyclones* are carried by and sustained by these large-scale upper curren *Subject Headings:* **1. Hurricane dynamics 2. Hurricane forecasting.**—*M.R.*

1898

7I–23 551.51

§Doberck, William, **The law of storms in the eastern seas.** Hong Kong, **1898.** 40 p. cha **NN**—General features of typhoons discussed: origin, signs, pressure, wind force, squalls, incurvat of wind, gradients and progressive motion of typhoon centers. Note on how to manage a ship

phoon and on weather forecasts and storm warnings given. Different classes of typhoons and sonal factors considered. Origin is attributed to conflicting currents. *Subject Headings:* **1. Ty-ons 2 Law of storms.**—*H.P. Kramer.*

1899

7I–24 551.515.2(02)(914)

*Bergholz, Paul, **The hurricanes of the Far East.** English trans. rev. by Robert H. Scott. men, Max Nössler, Dec. **1899.** 271 p. 7 figs., 31 plates and maps, 33 tables, foot-refs. Trans. his original German, **Orkane des fernen Ostens,** which was based on José Algué's **Baguios ó ones Filipinos,** pub. Manila, **1897.** (*See* 7I–21.) **DLC**—This is an English translation, with added chapter on **Winter storms or land storms,** of the German translation by BERGHOLZ of the nish edition of ALGUÉ'S text on **Baguios ó ciclones Filipinos.** Hence it has, according to ALGUÉ, much in the process of twice being translated. The general structure, however, is unchanged il the book is in a handy form. The first two parts include chapters on general elements of a lone, origin (theory and place), movement of air, pressure changes, rain and clouds, eye of storm, ucture, movement, tracks, classification, indications from clouds, cloud photography, indications n air currents, pressure changes, ship barometers, swell, cirrus-veil, halos, electric phenomena. Pt. III case histories of cyclones of 1893, 1894, 1882, etc. and, finally, anomalous cyclones (rain-, erratic movements, twin cyclones, bifurcation, secondaries, abortive and windless cyclones) described. Many tables and charts are faithfully reproduced and included. *Subject Headings:* **Tropical cyclone textbooks 2. Typhoon case histories 3. Translations 4. Philippine Islands. Scott, Robert H.** (*trans.*).—*M.R.*

1900–1901

7I–25 551.515.2:656.61(267.4)

*Eliot, Sir John, **Hand-book of cyclonic storms in the Bay of Bengal for the use of sailors.** ed. Calcutta, Meteorological Dept. of India, **1900–1901.** 2 vol. Vol. 1, Text. 310 p. 23 ., tables. Vol. 2, 47 plates and 3 figs. **DLC**—After an introductory chapter (p. 4–88) con-ning general meteorological information, the weather characteristics of the Bay of Bengal are cussed (Ch. 2, p. 89–110). Ch. 3 (p. 111–209) deals with properties of cyclonic storms in the ly, discussing various types of such storms, the associated barometric changes, cloud formations, appearance, squalls, the direction of swell, seasonal distribution of cyclones, rate of advance, . It is found that the cyclone season extends from April to Dec. From June 15 to Sept. 15 lonic storms are frequent but not violent. During the periods April–June 15 and Sept. 15–c., storms are less frequent but 2 out of 5 have hurricane force. In Ch. 4, eight typical Bay of gal cyclones or cyclonic storms are described, while Ch. 5 contains practical hints for sailors. e plates in Vol. 2 include tracks of cyclonic storms in the Bay for each month (1877–1887); a rt showing places of origin of 119 cyclonic storms (1888–1899); tracks of storms having wind ce of 8 or more, for each month (1882–1899); pressure and wind diagrams for 3 individual cyclones l a chart showing tracks of the 8 cyclones described in Ch. 4. *Subject Headings:* **1. Cyclones in Bay Bengal 2. Navigation in cyclonic storms 3. Cyclonic storm tracks 4. Bay of Bengal.**—*G.T.*

1902

7I–26 551.515.2(729.5,729.7)

Alexander, William Henry, **Hurricanes: especially those of Puerto Rico and St. Kitts.** *U. S. ather Bureau, Bulletin,* No. 32, **1902.** 79 p. 7 figs., 6 tables. **DWB**—Origin and life history hurricanes are discussed in general based on the convectional theory. Some cases of hurricanes l their behavior at Puerto Rico and St. Kitts are analyzed and tabulated. *Subject Headings:* **Hurricanes in the West Indies 2. Convectional theory of hurricanes 3. Puerto Rico 4. St. ts, Leeward Islands.**—*W.N.*

7I–27 551.515.2

Conrad, Joseph, **Typhoon.** New York, Knickerbocker Press, **1902.** 205 p. 5 figs. **DLC**—e terrifying fury of a full fledged hurricane as experienced aboard a steamship in the China Sea, vividly described in this classic novel. *Subject Headings:* **1. Typhoons in fiction 2. China Sea.** *W.N.*

1913

7I–28 551.515.2(729)

*Fassig, Oliver L. (*U. S. W. B., Wash., D. C.*), **Hurricanes of the West Indies.** *U. S. Weather reau, Bulletin,* No. 10, **1913.** 28 p. 24 plates, tables. **DLC**—A sizable monograph covering the tistics on hurricane areas, tracks, seasonal variations, frequency, rate of progress, duration, ensity, relation of hurricanes to typhoons and cyclones with respect to monthly and annual

frequency (1880–1899), signs of approach, and a history of the hurricane of Aug. 7–20, 1899 Puerto Rico and vicinity. The origin of tropical cyclones is discussed, and a table presented show latitude and longitude of origin and recurve of 134 hurricanes of West Indies, and mean paths months and by years (1876–1911); the daily progress of 138 hurricanes, and frequency by ye (1876–1911) in each month of the 3 major types of tropical cyclones. The 25 original charts color) show paths of all the West Indian hurricanes, paths during each separate month, frequer and duration, pressure change curves during 10 notable storms, monthly frequency of 3 types a of all types, annual frequency of 3 types, place of origin of 3 types, and elaborate graphs of hou observations at San Juan during course of hurricanes of Aug. 8, 1899; Sept. 1–5, 1906; Aug. 20–2 1909 and Sept. 6–7, 1910, and isohyetal charts for storm rainfall in Puerto Rico during those storn Finally, a world chart shows tropical storm areas and distribution of pressure, and prevailing wir during the hurricane season. *Subject Headings:* **1. Hurricane monographs 2. Hurricane cha 3. Hurricane case histories 4. Hurricane frequencies 5. Puerto Rico 6. West Indies.**—*M.R.*

1918

7I–29 551.515

Shaw, Sir William Napier, **The travel of circular depressions and tornadoes.** *Great Brita Meteorological Office, Geophysical Memoirs,* 2(12):19–44, **1918. DLC**—After giving the definitio of the cyclone center and the tornado center, the author computed and graphed the resultant of t superposition of a linear pressure field upon a field of circular isobars. Application to weather ma shows a striking similarity with the field in a tropical cyclone. *Subject Heading:* **1. Cyclone theory.** *H. Arakawa.*

1920

7I–30 551.515.2:912(26

Froc, Louis (*Dir. Zi-Ka-Wei Obs.*), **Atlas of the tracks of 620 typhoons, 1893–1918.** Zi-Ka-W Shanghai, Imprimerie de l'Orphelinat de T'Ou-Sè-Wè, **1920.** 4 p. 21 charts, 3 tables. At he of t-p: Zi-Ka-Wei Observatory. **DWB**—Besides a general summary of the geographical aspec of typhoons in the China Sea and Western Pacific, the seasonal rates of movement, extreme spee and points of recurvature in various areas of this region, the atlas consists of a series of charts showi mean isobars (in red) and tracks of separate typhoons (30 to 100 on a chart) which were observ during 26 years, by months (Dec. to June incl.), decades (July through Oct.), and semi-monthly Nov. Each chart has a brief summary of pressure and cyclone track movement during the spective period. Finally, there are 12 monthly charts showing major centers of action (in red) a areas of greatest typhoon activity (in black with density of shading corresponding to frequency typhoons during that month). *Subject Headings:* **1. Typhoon atlases 2. Typhoon tracks 3. T phoon frequencies 4. China Sea 5. Western Pacific.**—*M.R.*

1922

7I–31 551.515

§*†Newnham, Gertrude Fallows (Mrs. E. V.), **Hurricanes and tropical revolving storms.** *Gre Britain. Meteorological Office, Geophysical Memoirs,* 2(19):228–333, **1922.** 33 plates, numero tables, 71 refs. **DLC**—This memoir is a rich source of tabulated material. After a general intr duction, the "eye of the storm," height, location and theories of origin are described. Frequenci (average and year-by-year), tracks, recurve, speed of travel, duration and rainfall are then treat in detail, with typical and exceptionally severe examples, for the following regions: West Indies, We Africa (storm-squalls and tornadoes), Bay of Bengal and Arabian Sea, South Indian Ocean, Weste North Pacific, South Pacific, and Australian N.W. and N.E. coasts. Numerous maps of tracks a included and some synoptic charts. *Subject Headings:* **1. Tropical cyclones 2. Hurricanes 3. T phoons.**—*C.E.P.B.*

7I–32 551.515.11 551.515

Shaw, Sir Napier, **Introductory note on the birth and death of cyclones. A lecture given at Conference of Meteorologists at Bergen on July 22, 1920.** *Great Britain. Meteorological Offi Geophysical Memoirs,* 2(19):213–227, **1922.** 2 figs., plate, table. **DWB**—Traveling columns revolving air (as opposed to the Bjerknes model) are sometimes seen in temperate depressions secondaries at the surface, and often at 4 km, and also in tropical revolving storms and in tornado The transition from tropical revolving storms to temperate depressions is discussed. The tropic anticyclones originate in outbreaks of polar air, with a discontinuity on the equatorial side at whi cyclones originate over localities of hottest sea water. The first stage is the removal of a very lar volume of air by bubble convection and of water vapor by precipitation. The cyclone dies drawing in cold air. Finally, questions of stability and instability in anticyclones and cyclones a discussed. *Subject Headings:* **1. Cyclone dynamics 2. Tropical cyclone theory.**—*C.E.P.B.*

1923

7I–33 551.515.23(265)

Selga, Miguel, **Tropical revolving storms within eight degrees of the equator.** *Pacific Science Congress, 2nd, Melbourne and Sydney, 1923, Proceedings,* 1:665–671, pub. **1923.** 5 tables, 27 refs. Also his: **Birthplace of typhoons.** *Ibid.*, p. 672–680, **1923.** 2 tables, 2 refs. **DA, DWB** -Problem of origin of typhoons is approached from the empirical point of view with evidence obtained from geographical distribution and places of origin of the typhoons themselves. All known tracks of typhoons for 20 years, 1903–1922, are summarily investigated. Tables give date and location in latitude and longitude and total number of typhoons by year in several West Pacific localities. Author cites 70 examples in 50 years (since 1686 in the West Pacific alone) of typhoons within 8° of the equator, thus refuting other writers who deny this phenomena possible. (*Same items as* 36 and 41–37, Sept. 1953, *M.A.B.*) *Subject Headings:* **1. Typhoon formation 2. Western Pacific.**—*H. P. Kramer.*

1925

7I–34 551.515.2(265/266,267,261)

*†Fischer, Norbert. **Die wirtschaftlichen Schäden der tropischen Wirbelstürme. Eine wirtschaftsgeographische Untersuchung zur Frage der Wirtschaftinstabilität infolge von Wetterschäden.** [Economic loss due to tropical cyclones: an economic-geographical investigation into the instability of economy as a function of weather damage.] *Aus dem Archiv der Deutschen Seewarte,* Hamburg, **(1), 1925.** 54 p. tables, 137 refs. **DLC**—Contents include discussion of tropical cyclones in general, their extent, characteristics, tracks, factors causing damage, etc.; their distribution in east Asia and Pacific regions, as well as in Indian and Atlantic Oceans, the extent, type and economic significance of damage caused by them. Map of world shows extent and intensity of distribution. Some of the worst typhoons and hurricanes are listed by regions with very brief notes on damage brought by them. *Subject Headings:* **1. Tropical cyclone damage 2. Tropical cyclone distribution 3. Pacific Ocean 4 Indian Ocean 5. Atlantic Ocean.**—*G.T.*

7I–35 551.515.2(94)

*Visher, Stephen Sargent and Hodge, D., **Australian hurricanes and related storms with an appendix on hurricanes in the South Pacific.** *Australia. Bureau of Meteorology, Bulletin,* No. 16, **1926. 1925.** 54 p. charts, tables. **DWB, DLC**—The great mass of data on tropical cyclones in the various coastal regions of Australia and nearby oceanic and island areas is organized by regions and treated, storm by storm, from the earliest records down to 1925. The various forecast and warning services are also listed in detail. Bi-monthly storm track charts (in color), and a chart showing periods and limits of cyclones in the different areas from 110°E to 150°W and 10°–40°S, and other illustrative charts, plus tabulations of frequency by 5° squares and by months, years, place of origin, and groups and regions of Australia are included. *Subject Headings:* **1. Hurricane statistics 2. Australia 3. South Pacific.**—*M.R.*

7I–36 551.515.2(265/266)

*Visher, Stephen Sargent, **Tropical cyclones of the Pacific.** *Bernice P. Bishop Museum, Honolulu, Bulletin,* No. 20, **1925.** 163 p. 20 figs., 29 tables, 209 refs. **NNA**—Tropical cyclones in most of the Pacific area investigated at length. The work is based on field work done in Hawaii, Fiji, southeastern Australia and in the Far East in general. Author has sought to (1) gather data on tropical cyclones of the Pacific; (2) to study these and related storms elsewhere with regard to origin and characteristics, (3) to discover effects of Pacific tropical cyclones on life, directly and indirectly. Tropical cyclones in general are discussed along with distribution and frequency: hurricanes in the eastern South Pacific, typhoons in the western North Pacific, cyclones in eastern North Pacific, hurricanes of Australia and adjacent waters, tropical cyclones in the eastern South Pacific, etc., and effects of tropical cyclones in Pacific regions: winds, waves, rainfall, dispersal of life, etc. and possibilities of reducing damage. Many descriptions of individual occurrence are included along with a lengthy general bibliography. (There is a Japanese edition.) (*Same item as* 41–47, Sept. 1953, *M.A.B.*) *Subject Headings:* **1. Tropical cyclones in Pacific Ocean 2. Pacific Ocean.**—*H. P. Kramer.*

1926

7I–37 551.515.2(02)(76)

*†Cline, Isaac Monroe, **Tropical cyclones.** N. Y., Macmillan, **1926.** 301 p. 53+9 figs., 11 plates, 18 tables, bibliogs. p. 234–239 and 289–291. **DLC**—One of the major contributions to the literature on tropical cyclones, and to the understanding of the details of origin, structure and movement of West Indian hurricanes, based on 25 years of uniform specialized observations on the Gulf Coast and in South Atlantic States (1900 1924). The author experienced several of these major storms and was chief forecaster for the Southern and Gulf States during this period. In this book he has discussed the previous studies and theories, climatic characteristics of hurricane belt,

hourly changes in wind, precipitation and clouds in cyclone movements and changes, methods of charting, and case histories of 19 individual tropical cyclones (1900–1922), analysis of wind a precipitation in 4 larger hurricanes and 4 smaller ones, irregular movements, stagnant cyclon cloud movements in 6 large, 6 small and in stationary cyclones; temperatures in 3 types of cyclone steering currents, winds, orographic influences, precipitation distribution, redevelopment, e CLINE's book contains an enormous amount of statistical and synoptic data, and a thorough analys based on original observations of cloud, upper air flow, tide and precipitation data, by one active engaged in forecasting and protection of life and property. He emphasizes the conclusion th tropical cyclones propagate into areas of heaviest precipitation and strongest convective activ and in direction of cirrus movement, which is not radial or does not spiral outward. In case stagnation or small tropical cyclones, cloud indications may be erratic, however. *Subject Headin* **1. Hurricanes of Gulf Coast 2. Tropical cyclones 3. Gulf Coast 4. South Atlantic States.**—*M.*

7I–38 551.515.2(26

§*Horiguti, Yosiki, **Distribution of the meteorological elements in the Okinawa typhoon (On t typhoon of the Far East, Pt. 1).** *Kobe, Japan. Marine Observatory, Memoirs,* 2(3):111–162, O **1926.** 8 figs., 12 plates, 23+17 tables, 9 refs., 5 eqs. Also: **Pt. 2, Distribution of air temperatu and precipitation in the typhoon area.** *Ibid.,* 3(2):23–65, Dec. **1927.** 24 figs., 38 tables. **DWB** The first article gives a detailed account of the meteorological conditions during the typhoon Aug. 9 19, 1924. The second article examines numerous typhoons in the Ryukyu Islands regio 1915–1923. Conclusions are drawn regarding the temperature distribution with respect to distan from central region (found to be almost the same in all typhoons) and regarding the features temperature conditions, precipitation distribution, air density, etc. *Subject Headings:* **1. Okina Typhoon (1924) 2. Typhoon temperature 3. Typhoon rainfall 4. Okinawa 5. Ryukyu Island** —*H. P. Kramer.*

1929

7I–39 551.51

Humphreys, William Jackson, **Physics of the air.** New York, McGraw-Hill, **1929.** 654 226 figs., numerous tables and eqs. **DLC**—This textbook includes the theory of hurricanes 167–171). This is followed by brief discussions on these topics: place of occurrence, size and shap direction and velocity of wind, direction and velocity of travel, origin and maintenance. *Subj Heading:* **1. Hurricane theory.**—*W.N.*

7I–40 551.515.2(26

Hurd, Willis Edwin, **Tropical cyclones of the eastern North Pacific Ocean.** *Monthly Weath Review,* Wash., D. C., 57(2):43–49, Feb. **1929.** chart, 7 refs. **DWB, DLC**—Tropical cyclones, distinguished from "Northers" (which are anticyclonic winds, often of hurricane force) actual occur about 5 times a year ($\frac{1}{3}$ are of hurricane force) in a belt about 10° wide between 10° and 30° just off the west coast of Mexico. Most of them, as shown on a chart, move parallel to the coa from SE to NW, though some are erratic and move perpendicular to the coast (4 types are di tinguished) and a few cross the Isthmus into the Gulf of Mexico, though the highlands of Centr America usually break up such storms. The season of occurrence, according to data for 95 storm from 1910–1928 (U. S. Weather Bureau) and 45 from 1832–92 (Deutsche Seewarte), is from Jun Nov., with a sharp peak in Sept. The number per year varies from none (1914 and 1916) to 1 (1925). The author gives sources of data and quotes from reports dating back to DAMPIER an REDFIELD, and cyclones traced from German, Mexican and U. S. ship reports. The number early years was small because shipping was not heavy before the Panama Canal opened. O cyclone traveled 7000 mi from Acapulco to San Diego, thence across the United States to Newfoun land and the West Coast of Great Britain (Sept. 29–Oct. 8, 1921). Only rarely are cyclones foun in the "No-mans-land" south and west of the area frequented by these hurricanes. *Subject Heading* **1. Tropical cyclone tracks 2. North Pacific.**—*M.R.*

1930

7I–41 551.515.2(596/599,265.

*§Bruzon, E. and Carton, P., **Le climat de l'Indochine et les typhons de la Mer de Chine.** [Th climate of Indochina and the typhoons of the China Sea.] Hanoi, **1930.** 310 p. numerous char (fold.), diagrs., photos, tables, refs. 3rd ed., **1940** (with additional references and sections on vario elements and climatic summaries, and a chapter devoted to the influence of climate upon forest vegetation, etc.). **DWB**—These editions appear to be the most exhaustive works available on th subject. Pt. 1 in 1930 ed. deals with climate (p. 15–260). Pt. 2, with typhoons. The secon part consists of extensive treatment of typhoons in the China Sea, with diagrams, graphs, photo and synoptic charts. Contents include discussion of research and theories on cyclones and typhoon

sideration of formation zones, frequencies and trajectories of China Sea typhoons; their structure, h synoptic charts; their destructive effects including descriptions of several individual storms; l the organization of a warning service, stations, signals, symbols, etc. (*Same item as* 5B-185,). 1954, *M.A.B.*) *Subject Headings:* **1. Climate of French Indochina 2. Typhoons in the China 1 3. China Sea.**—*H.P. Kramer.*

1931

7I–42 551.515.2(914)

Selga, Miguel, **List of remarkable typhoons in the Philippines, 1919–1930.** *Philippines. ather Bureau, Meteorological, Bulletin,* p. 157–158, May **1931.** 2 tables. Also his: **List of ordinary hoons or depressions in the Philippines, 1919–1930.** *Ibid.,* p. 189–190, June **1931.** 2 tables. d his: **Percentage and distribution of typhoons by provinces and subprovinces of the Philippines.** *d.,* p. 221–223, July **1931.** chart, table. **DLC**—In the first article the date, lowest pressure and ation in the Philippines of "remarkable" (barometer readings below 742 mm) typhoons for 1919–30 are tabulated, supplementing CORONAS' list for 1903–1918. In the second article, another table es monthly and annual distribution for 1903–1930. The third article lists ordinary typhoons or ressions, 1919–1930, and gives further notes and data for both remarkable and ordinary typhoons. *bject Headings:* **1. Typhoon chronologies 2. Philippine Islands.**—*H. P. Kramer.*

1932

7I–43 51.515.2:551.542

Horiguti, Yosiki, **Energy due to the distribution of pressure in the area of typhoon.** *Kobe, pan. Marine Observatory, Memoirs,* 5(1):1–10, March **1932.** eqs. Also: Talman, Charles zhugh, **The strength of a hurricane.** *American Meteorological Society, Bulletin,* 13(12):233, c. **1932. DWB**—The author first summarizes his conclusions regarding the symmetry, tem- ature, pressure, wind speed, precipitation distribution, cloud, kinetic energy, friction and resulting sipation of kinetic energy in the form of heat, accumulation of air mass, vertical motion, circulation ft, and general structure of typhoons. Then he treats theoretically the equations for kinetic rgy in a cyclonic system, transformations of energy; application to an ideal typhoon, and n to the Okinawa typhoon giving numerical data to 700 km from center, and to 10 km depth; flux of air mass, of potential energy; work due to pressure gradient; energy loss due to resistance d radiation, and gain due to condensation of water vapor; heat converted from mechanical energy, x of internal energy, flux of mechanical work and, finally, the total gain of energy (14.8×10^{21} s/sec) and total loss (12.7×10^{21} ergs/sec). Thus it is shown that the energy balance is so close t energy must be imported into the system from outside if the circulation is to be maintained. *placement,* according to the Margules air mass (frontal) theory cannot stand up alongside of the *ewal theory,* i.e., a continually renewed supply of warm moist air to provide latent as well as ual heat energy for the system. It is shown that high water vapor content (as found over tropical eans) is more important than high temperature or pressure for energy *gain;* for energy *loss* lifting, d then radiational loss are the important factors. In note by C. F. TALMAN, it is stated that RIGUTI computed the energy of a typhoon as 27 billion (27×10^9) horse power. *Subject Headings:* **Energy of typhoons 2. Typhoon structure 3. Renewal theory of typhoons 4. Okinawa Typhoon 024).**—*M.R.*

7I–44 551.576:551.515.2

Horiguti, Yosiki, **Note on the distribution and the motion of the clouds in the area of typhoon.** *be, Japan. Marine Observatory, Memoirs,* 5(1):25–40, March **1932.** 10 tables, refs. plate lowing p. 40. **DWB**—The amount and type of clouds observed at distances of 100 to 1000 km 16 sectors of a moving typhoon (the Okinawa typhoon), the deviations from the mean amount clouds in each category; amount and kind of clouds observed by ships at sea; observations at ha by means of a nephoscope, clouds observed in other typhoons at Ryukyu and Ogasawara ands in July 1930, Sept. 1928, Aug. 1928 and Aug. 1927, are discussed and the data presented in tailed contingency tables and on a clever color diagram (a 3-dimensional model on a polar diagram owing the amount and type of clouds for 8 sectors with concentric rings for 0–250, 250–520 and 0–790 km distance, and the vertical distribution of cloud types with distance up to 900 km to nt and rear of cyclone, respectively). Among conclusions are: 1) very little difference is found cloud amount in different quadrants up to 300 km from center; 2) clouds converge in lower layers; follow gradient winds at top of lower clouds; 4) diverge from center in higher layers and in all ections so it is impossible to determine steering current from cirrus movement; 5) beyond 300 km re are more clouds on the right hand side than on the left; 6) cloud amounts were uniformly 10/10 to 400–500 km from center. The conclusions are all based on data from a limited number of phoons in a limited area. *Subject Headings:* **1. Typhoon clouds 2. Okinawa Typhoon (1924) Ryukyu Islands.**—*M.R.*

1934

7I–45 551.515

Tannehill, Ivan Ray, **The hurricane.** *U. S. Dept. of Agriculture, Miscellaneous Publication* No. 197, **1934.** 14 p. 15 figs., table. **DLC**—This monograph outlines causes and developme of hurricanes. The following topics are discussed briefly: history, causes, formative stages, plac of origin, progressive movement, irregular movements, hurricane winds, barometric pressure, rainfa tides, law of storms, dimension of hurricane, premonitory signs, frequency, hurricane warnings a track charts. Hurricanes for 1877–1933 are tabulated. *Subject Headings:* **1. Hurricane monograp 2. Hurricane chronologies.**—*W.N.*

1935

7I–46 551.515.2 (5

†*Japan. Central Meteorological Observatory, Tokyo, **Muroto-Taifu Chosa Hokoku.** [Repo on the Muroto Typhoon of Sept. 21, 1934.] Its *Memoirs*, V. 1, **1935.** 606 p. Pt. 1 (p. 1–295 184 figs. (incl. 35 photos). Pt. 2 (p. 297–422), 9 original papers on typhoons. bibliog., p. 423 4 (in Japanese). Appendix, p. 433–606, References and chronology and observational material tables. In Japanese. **DWB**—Pt. 1 of this special and very thorough report was devoted to th life history of the Muroto Typhoon, and was edited by Sakuhei Fujiwhara. On the morning Sept. 21, 1934, a very strong typhoon hit Japan. The lowest pressure, 684 mm Hg (~912 m was observed by a well-trained observer at Muroto Weather Station (for this reason this typhoon called the Muroto Typhoon). Maximum mean wind speed over 20 min period was 45 m/sec, wit a gust of 60 m/sec. Resulting damages from hurricane winds and flood were tremendous. Amon all the storm tides caused by this typhoon those at the head of Osaka Bay were the severest on recor About three thousand people perished. Contents of Pt. 2: 1.Ootani, Tohei, **Prediction of the typhoo movement by means of upper air.** 2. Arakawa, Hidetoshi, **Hydrodynamical model of cyclone anticyclones and thunderstorms.** 3. Fujiwhara, Sakuhei, **Application of so-called "Watanabe term" to the mechanism of cyclone.** 4. Arakawa, H. and Yoshitake, Motoji, **On the elevation of th surface of sea under the influence of a travelling low pressure.** 5. Terada, Kazuhiko, **Storm tide of Osaka Bay.** 6. Terada, K., **Damage to electric transmission lines due to atmospheric salinit during stormy conditions.** 7. Akamatsu, — and Shimozaki, —, **Wind speed observed durin passage of the Muroto Typhoon in lowland near the Cape of Muroto.** 8. Wadati, Kiyoo and Kizima Taku, **Microseism and inclination during passage of Muroto Typhoon.** 9. Kurashige, Eijir **Abnormal atmospheric chemical contents caused by severe sea winds** (*see* 7I–60). *Subject Heading* **1. Muroto Typhoon (1934) 2. Typhoon case histories 3. Japan. I. Fujiwhara, Sakuhei** (*ed.*).— *H. Arakawa.*

7I–47 551.515.2 (914

Selga, Miguel, **Charts of remarkable typhoons in the Philippines 1902–1934. Catalogue o typhoons 1348–1934.** Manila, Bureau of Printing, **1935.** 55 p. 12 maps, 12 tables. **DLC, DWB**— Tracks of remarkable typhoons (i.e., the barometric minimum of which goes below 745 mm) ar plotted for each month. Text accompanying each gives a brief description of the remarkabl typhoons; mentions the ordinary typhoons and depressions that have affected the weather of th Philippines from 1902–1934, and gives an abridged enumeration of storms and typhoons as describe by old chroniclers and reported in contemporaneous documents of historical typhoons. A tabl gives each month's amount of rainfall and rain days for numerous stations. *Subject Heading* **1. Typhoon charts 2. Typhoon chronologies 3. Philippine Islands.**—*H. P. Kramer.*

1936

7I–48 551.515.2 (265/266,54

Doraiswamy, Iyer V., **Typhoons and Indian weather.** *India. Meteorological Dept., Memoirs* 26(4):94–130, **1936.** 9 plates, refs. **DLC**—Typhoons of the Pacific Ocean and the China Sea which moved westwards and struck coasts of Indochina or south China, 1884–1930, are examined found that 135 out of 370 affected the weather of India. Typhoons are classified according to th degree of redevelopment of the residual lows in India. Short account of each of these typhoon and effects on Indian weather given. Tracks are drawn for those which developed in storms o depressions. Discussion of season, path of travel, reasons, extent, etc. also included. *Subject Headings:* **1. Typhoon effects on weather 2. Typhoon structure 3. Pacific Ocean 4. China Sea 5. India.**—*H.P. Kramer.*

7I–49 551.515.21 (265

†§Li, S., **Untersuchungen über Taifune.** [Investigations on typhoons.] *Berlin. Universität Meteorologisches Institut, Veröffentlichungen*, 1(5), **1936.** 38 p. 16 figs., 8 tables, 66 refs. **DLC**— The origin, development, path, frequency (seasonal, year to year and regional), the structure, th

e" and dynamics of typhoons in the Western Pacific are treated in this monograph, with examples n 4 cases in 1928 and 1934 analyzed and the typhoons of the year 1911 discussed. It is concluded t typhoons originate when cold Polar air from Australia moves over the warm tropical waters and s up an enormous amount of moisture. This occurs at the season of greatest typhoon activity. hoon trajectories are determined by the general air flow and by pressure fields. The literature yphoon dynamics is briefly surveyed. (*Same item as* 6B–18, Feb. 1955, *MAB.*) *Subject Head-*: **1. Typhoon dynamics 2. Typhoon origin 3. Typhoon frequencies 4. Typhoon bibliographies Western Pacific.**—*M.R.*

7I–50 551.515.21(267.4)

Ramanathan, K. R., **Soundings of temperature and humidity in the field of a tropical cyclone a discussion of its structure.** *India. Meteorological Dept., Memoirs,* 26(5):79–92, **1936. C**—Data of the Bay of Bengal storm Nov. 17, 1933 are presented and discussed in the first part his paper. It is concluded that (1) the strong concentration of upward vertical movement in the ghborhood of the low pressure center was predominantly in advance of the storm center; (2) the m air rising above the rainfall area and moving with the wind acts as "leader" of the storm; the vertical structure of tropical cyclone and the "occluded" cyclone of temperate latitudes is ilar if assumed that dry air takes the place of cold air in the latter. Considering certain aspects ropical cyclones it is concluded that (1) no exceptional and sudden rises of pressure have been erved in the torrential rainfall region, (2) the central vortex is caused by warm-air concentrations t connected with a tropical up-glide front and (3) the heavy rainfall is largely responsible for id local increases of temperatures. *Subject Headings:* **1. Tropical cyclone analysis 2. Bay of ngal cyclone (Nov. 1933) 3. Bay of Bengal.**—*W.N.*

7I–51 551.515.21(263)

§Rodewald, Martin, **Die Bedeutung des Dreimassenecks für die subtropischen Sturmtiefdungen.** [Significance of the three-mass-corner for the formation of tropical cyclones.] *Annalen Hydrographie und Maritimen Meteorologie, Zweites Köppen-Heft* (Supplement to the Sept. 1936 e):41–54, **1936.** 10 figs., 22 foot-refs. **DLC**—The principle of the 3-air mass (or two-frontal) rsection theory of origin of hurricanes (*see* 7I–52) is reviewed and applied to the case of the ricane of Oct. 8–9, 1903, which is analyzed in great detail, synoptically and dynamically, going k to the situation in the subtropical Atlantic on Sept. 30—24 hours before the cyclone's birth, following its evolution through Sept. 9. *Subject Headings:* **1. Three-mass theory of cyclogenesis Hurricane analysis 3. Hurricane of Oct. 8 9, 1903 4. Atlantic Ocean.**—*M.R.*

7I–52 551.515.2

Rodewald, Martin, **Die Entstehungsbedingungen der tropischen Orkane.** [The conditions genesis of tropical hurricanes.] *Meteorologische Zeitschrift,* Brunswick, 53(6):197–211, June 6. 11 figs., 57 refs. **DLC.** Also: Gherzi, E., **Über den Ursprung der tropischen Zyklonen.** [On origin of tropical cyclones.] *Ibid.,* 54(3):106–108, March **1937.** foot-refs. **DLC**—The present tribution represents one of the outstanding theoretical, albeit highly controversial, contributions hurricane science of the past century. The model which is so thoroughly developed and supted, schematically, is based on the idea that hurricanes (or typhoons) originate where 3 contrasting masses come together: the normal trade wind mass, a modified polar air mass from the "hurricane misphere," and a "cold" air mass from the winter and spring hemisphere (i.e., the Southern misphere). RODEWALD maintains that the air from across the equator is colder aloft than that he doldrums or trades of the summer hemisphere, and shows graphs indicating a not-too perfect ative correlation between frequency of West Indian hurricanes and air temperature in the S. antic (St. Helena) based on records from 1882–1920, and a similar correlation between Indian an hurricanes and winter rainfall in Baluchistan. The two-frontal models are questioned by ERZI who maintains that such a theory must be tested against fact; that no temperature contrasts h as would be presumed in the theoretical model actually exist in the "Hurricane Haunts" and t we must take them as they are, not as we would like them to be. *Subject Headings:* **1. Hurricane ory 2. Three-mass theory of cyclogenesis 3. Frontal theory of hurricanes.**—*M.R.*

1937

7I–53 551.515.2:551.577(914)

§Deppermann, Charles E., **Wind and rainfall distribution in selected Philippine typhoons.** Manila, **7.** 38 p. 22 figs., 11 refs. **NNA**—This study considers the wind distribution and rainfall und a typhoon that crossed the Visayas, the region between South Luzon and Mindanao, where ographical features are not too obtrusive. Particular examples of typhoons are discussed with responding synoptic charts and diagrams. *Subject Headings:* **1. Typhoon rainfall 2. Typhoon lysis 3. Philippine Islands.**—*H. P. Kramer.*

7I–54 551.515.2(

§Great Britain. Meteorological Office, **Weather in the China Seas and in the western of the North Pacific Ocean, Vol. 1, Pt. 2. Typhoons.** London, **1937.** 45 p. 12 figs., 47 pl 22 refs. **DWB**—Typhoons in the region are treated. Warnings of approach and sequence of and weather are discussed as well as theories of birth and death of tropical cyclones; zones of o of typhoons and seasonal changes in position; synoptic indications of formation; filling up of phoons; danger area and paths and frequency in different areas; movements, height, upper currents in the vicinity of typhoons and single observer forecasting. Numerous synoptic ch with explanatory notes on the various typhoon conditions are appended. (*See also* 5B–172, 1954, *MAB.*) *Subject Headings:* **1. Typhoon analysis 2. China Sea 3. Western North Pacifi** *H. P. Kramer.*

7I–55 551.515.2:551.515.8(26

§Kidson, E., **The cyclone series in the Caribbean Sea, October 17–24, 1935.** *Royal Met logical Society, Quarterly Journal,* 63(271):339–351, July **1937.** 8 figs., 2 refs. **Discussion,** p. 352. **DWB**—Description of weather from personal experience on a voyage. Daily synoptic ch are drawn for North and Tropical Atlantic, including fronts. On Oct. 17 an intense anticyclone over the eastern U. S., with a broad current of cold air on its eastern side; there was a warm S current over the S.W. Caribbean. On Oct. 18–20 a front appeared with waves on it becom occluded. On the 21st a wave near Jamaica deepened, causing gales and heavy rain. Again on 24th a wave developed into a deep cyclone. The air from the Southern Hemisphere acted as warm mass, that from the north as the cold mass. *Subject Headings:* **1. Tropical cyclones 2. Ca bean Sea.**—*C.E.P.B.*

1938

7I–56 551.515.23(26

§†Deppermann, Charles E., **Typhoons originating in the China Sea.** Manila, Weather Bur **1938.** Review by author in *A. M. S., Bull.,* 19:375–376, **1938.** 51 p. 37 figs., map, tables refs. **DWB, NNA**—Conditions of formation are discussed. Several typhoons are considered detail with their accompanying synoptic charts. It is found that all storms studied formed al the line of discontinuity between two or even three air masses. Some places in the China Sea more adapted than others for typhoon formation. Convergence or "jamming" is found to b least very generally present. *Subject Headings:* **1. Typhoon formation 2. Typhoon analy 3. China Sea.**—*H. P. Kramer.*

7I–57 551.515.2(26

§Jeffries, C. W. and Heywood, G. S. P., **The law of storms in the China Sea.** (**Appendix to Hong Kong Meteorological Results, 1937.**) Hong Kong, Royal Observatory, **1938.** 26 19 plates, 8 tables, 23 refs. **DWB**—Summarizes present knowledge of formation, developm progress and end of tropical storms of the Far East, and gives some account of tropical storm general. Ch. 1 deals with cyclones in general, including theories on origin of tropical cyclo Ch. 2 takes up typhoons of the China Sea—origin, frequency, tracks, influence of surface press distribution, abnormal tracks, rate of travel and surface circulation. Precursory signs are discus in Ch. 3, including upper winds, clouds, pressure, swell, etc. Some synoptic charts, typical a abnormal typhoon tracks, barograms and schematic diagrams are included. *Subject Headi* **1. Tropical storms 2. Law of storms 3. China Sea.**—*H. P. Kramer.*

1939

7I–58 551.515.2(9

†*Deppermann, Charles E., **Some characteristics of Philippine typhoons.** Manila, Weat Bureau, **1939.** 128 p. 122 figs., 3 maps, numerous tables, 81 refs. **NNA**—Detailed report is m as a result of examination of practically all records of typhoons at Manila Observatory since 18 Contents include consideration of historic details, relative and absolute calms in typhoons, freque of lightning near center, anomalies between barometric gradient and wind force, pressure oscillati in typhoons, the typhoon wave, typhoons with sustained very steep gradients, fast typhoons, sma storms, mountains and typhoons, effect of Philippine Islands, questions of homogenous trade wi core, fronts in centers of typhoons and miscellaneous wind and rainfall data. A good bibliograp on typhoons in Philippine regions and in general is included. *Subject Headings:* **1. Typhoons in Philippine Islands 2. Philippine Islands.**—*H. P. Kramer.*

7I–59 551.515.23(9

§Deppermann, Charles E., **Typhoons and depressions originating to the near east of the Philippi** Manila, Weather Bureau, **1939.** 44 p. 23 figs., table, 9 refs. **DWB**—Investigation is presen on conditions of formation of typhoons and depressions originating in the region bounded on no

at. 20°, on the south and east by Marianas, Carolines and Bonins and on west by the Philippines. hor believes that in the formation of these storms, the undeviated trades of the Southern Hemi- ere often play an important part. Cases of typhoon origin have been carefully selected, and the stigation is carried back no earlier than 1924. Individual storms are studied along with cor- onding synoptic charts. Table gives list of typhoons originating to near east of Philippines 1924–1928. *Subject Headings:* **1. Typhoon formation 2. Depressions 3. Philippine Islands.** *P. Kramer.*

7I–60 551.515.2(52)

§Fujiwhara, S., **On the evolution of the Muroto Typhoon.** *Kobe, Japan. Marine Observatory, moirs,* 7(2):141–158, July **1939.** 14 figs., tables, refs. Also: Horiguti, Y., **The passage on land he Muroto Typhoon.** *Ibid.*, p. 159–192. 45 figs., tables. Also: Mizuno, T., **The barometric ling and computation of the lowest pressure.** *Ibid.*, p. 193–199. 2 figs., table. Also: Horiguti, **Depth of the center of the Muroto Typhoon.** *Ibid.*, p. 201–207. 5 figs, 2 refs. Also: Terada, **On "tunami" or destructive sea waves excited by a travelling typhoon.** *Ibid.*, p. 209–230. gs., tables, ref., 17 eqs. **DWB, DLC**—This series of studies of the famous Muroto typhoon of t. 13–21, 1934 gives details of the genesis, development, forecasting, passage over Japan, lowest ssure recorded (912 mb. or 26.93″ at Muroto on Sept. 21) and lowest pressure calculated for er which passed near Muroto (873 mb. or 25.78″). Previous world's record on land had been 35″ or 919 mb. at False Point Lighthouse, India on Sept. 22, 1885. The methods of calculation he actual pressure at Muroto and of the estimated pressure at the center are set forth meticulously the articles by Mizuno and Horiguti on p. 193 and 201, respectively. Barograms, thermograms, mograms, pressure gradient profiles, hourly synoptic and trajectory charts and supporting data included. The last article gives detailed theory of typhoon tsunamis or surges, application to 3 s, and verification of theory on the basis of data for Osaka Bay during the Muroto Typhoon (*see* 46). *Subject Headings:* **1. Muroto Typhoon (1934) 2. Pressure extremes in typhoons 3. Ty- on analysis 4. Tsunamis from typhoons 5. Muroto, Japan 6. Osaka Bay, Japan.**—*M.R.*

7I–61 551.515.2(265/266)

Netherlands. (K.) Meteorologisch Instituut, **Statistics relating to typhoons from about 3300 herlands ship observations, 1910–1935.** Its [*Publication*], No. 119, **1939.** 2 Vols. Vol. 1, t. 100 p. Vol. 2, Illustrations. 54 p. **DLC.** Also issued in Dutch language edition as its *ave*, No. 119, pub. **1938–1939.** This edition, **Statistieken omtrent typhonen uit ongeveer 3300 lerlandsche scheepswaarnemingen, 1910–1935,** has Vol. 1 with text in Dutch. Vol. 2 has lish text, with title-page in Dutch and English. **DLC**—Text contains general information about rvations and methods of working up observations using punched card system, analyzed statistics ll phases of hurricane structure, movement and forecasting: pressure below normal, wind direction force, swell, clouds, rain, air temperature, lightning, miscellaneous phenomena in typhoons, ents, general air circulation in vicinity of typhoon, and summary of knowledge relating to igation. Appendix I—pressure in China seas; II—data on air temperature in the China seas, detailed charts in black and white and in color, relative to associated phenomena listed above. excellently compiled, written, edited and printed work on a subject which, though covered by ious works in several languages, had not been attempted for 35 years in a thorough statistical ner. Regions represented include China Sea and Pacific between the Philippines and Japan at. 145°E. (*Same item as* 4I–115, Sept. 1953, *MAB.*) *Subject Headings:* **1. Typhoon statistics hina Sea 3. West Pacific. I. Keyser, H. II. van Hal, J. M.** (Miss).—*M.R.*

7I–62 551.5(05)

Philippines. Weather Bureau, **Meteorological Bulletin, 1865–1939.** Title and periodicity ed. **Observaciones verificadas en el Observatorio Meteorológico de Manila,** 1865(?)–1890 and **etín Mensuel** (sometimes **Meteorológico**), 1890–1901, together constitute V. 1–37, 1865–1901 riginal series. **Monthly Bulletin,** 1901–1926, **Meteorological Bulletin,** 1926–1933, and **Meteoro- cal Observations made at the Central Office,** 1933–1939, renumber from No. 1 each year. Title inued later as **Meteorological Observations made at Manila Central Office** 1947–. **DWB,** (broken)—Official periodical regularly contains descriptions, data, tracks, etc. of typhoons ng each month for each year as part of the regular weather summary. These notes, etc. are too uent and numerous to list separately. (*See also* 5B–1, Feb. 1954, *MAB.*) *Subject Headings:* **eriodicals 2. Typhoons.**—*H. P. Kramer.*

7I–63 551.515.2:551.513(729.1)

Vásquez, Eulogio (*Dir., Obs. de Montserrat, Cienfuegos, Cuba*), **Nueva orientación en los estudios ónicos.** [New orientation in the study of cyclones.] Havana, **1939.** 66 p. figs. Thesis S.)—Univ. of Havana (?).—A translation into English by Mrs. A. R. Stoesen of Vásquez' nish resume appeared as **Effect of the zonal discontinuity on tropical cyclones,** in *American*

Meteorological Society, Bulletin, 22(10):395–403, Dec. **1941.** 2 figs. **DWB**—Observations of direction of movement of high clouds (cirrus) and surface winds at Havana for 11 years are analy to show the reason for the place and time of origin and of recurvature of tropical cyclones in "zonal discontinuity" or region between the zonal winds from the E and from the W. The rea for the slowing down of a hurricane when about to recurve is attributed to its proximity to the zo discontinuity—the upper part of the cyclone having a larger diameter than the lower, comes i the aegis of the westerlies while the lower portion is still entirely in the easterlies. This produces interaction which acts as a brake on the movement of the system as a whole. Later, when the lo portion also is caught in the westerly circulation the system speeds up, but in a northeasterly directi *Subject Headings:* **1 Recurvature of hurricanes 2. Zonal discontinuity theory 3. Steering curr 4. Havana, Cuba. I. Stoesen, Mrs. A. R.** (*trans.*)—*M.R.*

1940

7I–64 551.557:551.

†§Deppermann, Charles E., **Upper air circulation (1–6 km.) over the Philippines and adjac regions.** Manila, **1940.** 64 p. 60 figs., map (fold.), 31 refs. **NNA**—The main air streams fr 1 to 6 km in the region of the Philippines are kinematically analyzed month by month, including area from Burma to Guam and New Guinea, and from north Formosa to north Australia. Cha are given showing the mean extent, direction and force of each of these air streams at the surf and aloft for Jan., April, July and Oct. Upper air circulation in typhoons of the Philippine a for 1938 and 1939 is studied in some detail, and its complexity brought out. Influences of differ air streams on developments of depressions and typhoons are considered. (*Same item as* 5B–1 Feb. 1954, *MAB.*) *Subject Headings:* **1. Upper air winds 2. Atmospheric circulation 3. Typho 4. Philippine Islands 5 Western Pacific.**—*H. P. Kramer.*

7I–65 551.582(5

†Great Britain. Meteorological Office, **Weather in the Indian Ocean, Vol. 2, Pt. 1, The co of Burma.** London, **1940.** 140 p. 34 figs., 8 tables, 78 refs. **DWB**—Contents include a summa of general weather characteristics of the Burma coast region, and more detailed treatment of p ticular elements: depressions and tropical cyclones, surface and upper winds, visibility, cloud, r and hail, temperature, humidity, thunderstorms, waterspouts, sea conditions, etc. The work well illustrated with diagrams, charts, surface and upper wind roses, and tables of general clima conditions, winds, visibility and sea conditions. (*Same item as* 5B–190, Feb. 1954, *MAB.*) *Sub Headings:* **1. Climate of Burma 2. Climatic data 3. Tropical cyclones 4. Burma Coast.**—*H. Kramer.*

7I–66 551.515 551.509(58

Ootani, Tohei, **Bohu-u.** [Severe storms.] Tokyo, Iwanami Book Co., Ltd., **1940.** 158 figs., tables. Entirely in Japanese. **DLC**—Popular treatise on severe storms, especially typhoo The author discusses his wide experience in weather forecasting. The following subjects are covere Ch. 1. Severe storms and mankind, Ch. 2. On winds, Ch. 3. On typhoons (in which almost aspects of these tropical cyclones are explained) and Ch. 4. Extratropical cyclones and northw monsoons in winter. A few schematic diagrams or charts are included. *Subject Headings:* **1. Seve storms 2. Typhoons 3. Popular science books 4. Extra tropical cyclones.**—*H. Arakawa.*

7I–67 551.582.2(914) 551.515.2:9

Philippines. Commission of the Census, **Census of the Philippines, 1939.** pub. **1940. DLC** Vol. 5, **Atlas** [Section of Maps], contains 4 meteorological maps: 1) Climatic map, showing fo climatic types. 2) Frequency of rainfall in the Philippines; average monthly conditions for vario sections, one map for each month. 3) Amount of rainfall in the Philippines; average montl conditions for various sections (12 maps, one for each month). 4) Tracks of remarkable typhoo affecting the Philippines during the 36 years, 1903–1938 (12 maps, one for each month). "Rema able typhoons" are considered those with barometric minimum below 745 mm. (*Same item* 5B–193, Feb. 1954, *MAB.*) *Subject Headings:* **1. Climatic charts 2. Typhoons 3. Philippi Islands.**—*H. P. Kramer.*

1942

7I–68 551.515.2:6

*†Schubart, Ludwig, **Praktische Orkankunde: Manövrieren in Stürmen.** [Practical hurrica science: navigation in storms.] 2nd rev. ed. Berlin, E. S. Mittler und Sohn, **1942.** 156 p. 1 figs. (incl. photo), numerous tables, 110 refs., eqs. Pt. 1, **Die tropischen Wirbelstürme,** [Tropic cyclones], p. 27–66; Pt. 2, **Die Schiffsführung bei Wirbelstürmen,** [Marine navigation in hur canes], p. 67–151. **DLC**—The best technical knowledge and data contained in over 100 of t major works on hurricanes, typhoons and other tropical cyclones, from a theoretical, historic

navigational point of view, is reviewed in the manual guide and history, theory and regional considerations in the first part ... and path of ... Subject Headings: 1. Navigation in hurricanes 2. Hurricane ... navigation manuals. —*M. B.*

1944

7I–69 551.515.2

... On the theory of cyclones. *Journal of Meteorology*, ... 1944. ... DWB—... a clear account of ... a medium of ... and associated internal waves in a ... medium. Authors investigate the mechanism of this association. The relations be... ... above ... westerlies above this critical speed and increasing with height, and with easter... increasing with height, incipient waves grow, owing to thermal asymmetry. Cyclones develop ... unstable regions and if symmetrical, tend to drift westwards, but in temperate latitudes ... of the isobars and the upper wave pattern usually overcome this tendency causing ... motion. (*Same item as* 3.5–155, May 1952, *MAB.*) *Subject Heading:* 1. Cyclone theories. —*A. B. S.*

7I–70 551.515.23 (52) (406)

... Observatory, Tokyo. **Nihon taifu shuyo.** [Monthly composite maps on typhoons.] Tokyo, **1944.** fig., 264 charts, table. **MH-BH**—Monthly composite ... for typhoon tracks during each month for a 50-year period, 1891–1940, are printed in this ... Even though the tracks in earlier periods are rather undependable, it is quite helpful to ... the secular change which appeared in the formation and movement of typhoons. More ... data since 1941 are also printed in serial form. *Subject Headings:* 1. Typhoon tracks 2. Typhoon data 3. Japan.—*H. Arakawa.*

7I–71 551.515.23 (52) (405)

Japan. Central Meteorological Observatory, Tokyo. **Showa 17 nen 8 gatsu 27.28 nichi no ...-takashio chosa hokoku** [Report on typhoon and storm tides on August 27–28, 1942.] Its *...sified Memoirs*, Vol. 6, **1944.** 357 p. 191 figs., numerous tables. In Japanese. **MH-BH**—Aug. 27–28, 1942, a very severe typhoon hit western Japan and caused severe damage. The ... tides overflowed the lowland of the Inland Sea. This elaborate report is a study of the life ... of this historical typhoon. *Subject Headings:* 1. Storm tides 2. Typhoon, Japan (Aug. 8, 1942) 3. Japan.—*H. Arakawa.*

7I–72 551.515.23:551.557 (263.4.74/75)

Riehl, Herbert and Shafer, Robert J., **The recurvature of tropical storms.** *Journal of Meteor...*, 1 (1 2):42–54, Sept. **1944.** 7 figs., 11 refs. **DWB**—The relation of the paths of four tropical ... in the Gulf of Mexico and Atlantic Coast areas (1935–41) and the upper wind field, especially ... in the height of the base of the polar westerlies, is examined. If the base lowers greatly ... of a storm in connection with an eastward moving middle-latitude trough and remains low, ... ward recurvature results. If the upper westerlies cannot maintain themselves in low latitude, ... storm will by-pass the northern trough and continue westward. In applying these principles to ... analyses of tropical disturbances for 1935–43, only 3 failures were encountered. *Subject Headings:* ... steering current 2. Recurvature of hurricanes 3. Hurricane tracks 4. Gulf of Mexico ... Atlantic Coast of United States.—*Author's abstract.*

1945

7I–73 551.515.2 (94)

Humphrey, P. A. and Fite, R. C. (*U. S. Office of Naval Operations*), **Typhoon reconnaissance ... through September 1945.** *U. S. Office of Naval Operations, NAVAER*, 50-1R-190, **1945.** ... (*U. S. Office of Naval Operations*), **Typhoon reconnaissance** Meteorological Squadron ..., **May through November 1946.** Its *NAVAER* 50-1R-206, **1947.** 241 p. plates, numerous ... **Typhoon reconnaissance:** Meteorological Squadron One, May through No... ber 1947. *Ibid.*, 50-1R-206A, **1948.** 254 p. numerous charts, graphs, photos. **DWB**—... a summary of ... with ... and ... Squadron

One. Report consists of detailed consideration of 13 typhoons, insofar as their history is revea by the reconnaissance flights of the Meteorological Squadron. Notes on synoptic conditions features of each typhoon as well as synoptic charts, vertical and horizontal cross sections, tra etc. are included. The third contains original photographs from Meteorological Squadron C Lacks several of the typhoons included above, but contains typhoon of Aug. 10–13, which is omit from that. (The third article is *same item as* 2H–123, Aug. 1951, *MAB.*) *Subject Headin* **1. Typhoon reconnaissance 2. Aircraft weather reconnaissance 3. Radar echoes from typhoo** —*H. P. Kramer, W.N.*

7I–74 551.51

Lackner, Peter R., **Tropical cyclones throughout the world.** *U. S. Naval Institute, Proceedin* 71:1059–1081, Sept. **1945.** 18 plates, table. **DWB**—General survey of tropical cyclones, hurrica and typhoons as they occur regionally in particular parts of the world, their causes, movemen etc. illustrated by charts showing normal and mean trades and limits of cyclone areas and summ frequency tables. *Subject Headings:* **1. Tropical cyclones 2. Cyclone distribution.**—*H. P. Kram*

1946

7I–75 551.515.21:551.515.23(6

Emon, Jean, **Exemples de cyclones tropicaux mort-nés à Madagascar.** [Examples of abort tropical cyclones originating in Madagascar.] *Madagascar. Service Météorologique, Publicati* No. 7, July, **1946.** 33 p. charts. **DWB**—In the intertropical convergence zone of the Ind Ocean, these disturbances, which develop to varying degrees, often appear on the weather char some become full fledged hurricanes, some poorly developed hurricanes and some die out witho ever reaching the hurricane stage. This last class are called tropical cyclones "born dead" undeveloped. Three examples of such abortive cyclones are analyzed and described in full: one March 5, 1946, one on March 5, 1940 and one on March 12, 1943—all in the neighborhood of Ma gascar. Barograph traces and surface synoptic charts are appended for each case. Local pe liarities of the island of Madagascar, which inhibit or favor development of such cyclones, a discussed. (*Same item as* 4.7–79, July 1953, *MAB.*) *Subject Headings:* **1. Tropical cyclon 2. Hurricane formation 3. Madagascar.**—*M.R.*

7I–76 551.515.2:551.509

Simpson, Robert, **On the movement of tropical cyclones.** *American Geophysical Uni Transactions*, 27:641–655, **1946.** 19 figs., table, 8 refs. **DWB**—Results of this study indicate t the steering level of a tropical cyclone is determined by the height to which the storm's vorti circulation extends, being located approximately at the elevation where closed isobars over t storm disappear, between below 10,000 ft to 50,000 ft with as much as 10,000 ft variation in 24 h A new tool for forecasting direction of movement of tropical cyclones is described and consider more valuable and effective than steering level analyses: tongue of warmer lighter air is orient with the axis of the storm and thus gives indication of storm direction for the ensuing 24-hr perio Examples cited use synoptic situations in the United States and South Atlantic regions. *Subj Headings:* **1. Tropical cyclone movement 2. Tropical cyclone forecasting.**—*H. P. Kramer.*

1947

7I–77 551.515.1:656.6(7

Meier, Frank, **Hurricane warning: notable storms involving sailing ships on our sea coast a Great Lakes.** New York, Dutton, **1947.** 254 p. photos. Price: $3.50. **DWB**—Popular accoun of twenty storms which caused great damage or loss of life in various coastal areas of the Unit States, from Maine to the Gulf, on the Pacific Coast and the Great Lakes. (*Same item as* 3.1–9 Jan. 1952, *MAB.*) *Subject Headings:* **1. Storms 2. Marine disasters 3. United States.**—*M.R.*

7I–78 551.511:551.515.2:551.509.3

Sawyer, J. S., **Notes on the theory of tropical cyclones.** *Royal Meteorological Society, Quarte Journal*, 73(315–316):101–126, Jan.–April **1947.** 11 figs., 9 refs., 22 eqs. **DWB**—The mechanis by which air is evicted from the top of a rising column, giving rise to a tropical storm, is discusse The necessary conditions are: an unstable lapse rate and development of CuNb, anticyclonic circul tion at some level aloft increasing outwards at more than a critical rate, and a cyclonic circulati decreasing with height. In the upper levels a cyclonic vortex is surrounded by an anticyclo vortex. The fall of central pressure is due to release of latent heat and centrifugal action. T "eye" is attributed to horizontal turbulence. Cyclones often form on the intertropical front but is unlikely that fronts can persist. *Subject Heading:* **1. Tropical cyclone theory.**—*C.E.P.B.*

7I–79 551.515.2(759) 551.501.81

Wexler, Harry, **Structure of hurricanes as determined by radar.** *New York Academy of Sciences, nals*, 48(Art.8):821–844, Sept. 15, **1947.** 8 figs., 2 tables, 12 refs. **DLC**—Discussion of radar servations of the hurricane of Sept. 14–15, 1945 in Florida, as photographed at Orlando. Path pressure center compared with path of rotation, as deduced from radar scope photographs, is own. Discussion of drop size necessary for returns and evident weather conditions accompanying s hurricane as deduced from such returns and from surface observations in a close network. alysis of cloud or precipitation bands forming concentric (spiraling inward) rings and a tentative planation are given. Comparison with conditions observed by radar, etc., in typhoons of Aug. 26, 45 and Dec. 18, 1944 in the west Pacific, including width of bands, spacing of bands, inward raling of bands, eye of the storm, and explanation of bands. Path of Florida hurricane shown; ssibility of tilt of axis with height discussed. Errors in determination of pressure center and of lar center, and true difference between pressure center and rotation center can be calculated. PPERMANN's data show that pressure and wind rotation centers do not always coincide. (*Same n as* 2H 90, Aug. 1951, *MAB.*) *Subject Headings:* **1. Radar storm detection 2. Hurricane ucture 3. Radar echoes from hurricanes 4. Florida.**—*M.R.*

1948

7I–80 551.515.23(267)

§Emon, Jean. **Le cyclone tropical destructeur des 26 et 27 janvier 1948 a la Réunion.** [The structive tropical cyclone of January 26 and 27, 1948 at Réunion.] *Madagascar. Service Mérologique, Publication*, No. 12, Oct. **1948.** 31 p. 12 sheets. 2 tables, 2 barograms, 10 charts, hotos, 11 refs. **DWB**—A detailed analytical account of the tropical cyclone which moved southrd in the Indian Ocean from Jan. 23–28, 1948, passing close to Réunion (minimum pressure 971 o at St. Pierre, at 3 a.m. Jan. 27) causing the loss of 165 lives and 4½ billion francs in property. hough 20 other hurricanes are listed as involving lower pressure at Réunion, and several resulted greater loss of life, none have produced more property damage. The meteorological situation m the point of view of the difficulties in forecasting such a destructive cyclone, when indications re that it would be a mild disturbance, is presented and supported by numerous synoptic charts d barograms, as well as photographs of damage. (*Same item as* 8-46, Oct. 1950, *MAB.*) *Subject adings:* **1. Tropical cyclone in Réunion Island 2. Réunion Island.**—*M.R.*

7I–81 551.515.2(529)

Formosa. Weather Bureau, **On Taiwan typhoons during the recent 50 years, 1897–1946.** rmosa, **1948.** 31 p. figs., tables. In Japanese; English summary, p. 30–31. **DWB**—The onthly frequency distribution of typhoons (listed in extensive appendix with much pertinent data), ich crossed Formosa between 1897 and 1946, is calculated and the tracks of these storms plotted charts for each of the months from May to Oct. and are compared with all typhoons originating the western Pacific. Typhoons are classified according to 3 intensities, those which are most ense only occurring in July–Sept. Speed of movement and course are not uniform, though the ual speed is from 3–20 mph. Rainfall distribution near typhoons is also studied and examples owing isohyetal charts and synoptic situation for some of the remarkable ones are given. Foreists and warnings, damage and loss of life are also discussed. (*Same item as* 2.11–80, Nov. 1951, *AB.*) *Subject Headings:* **1. Typhoons 2. Typhoon statistics 3. Formosa.**—*M.R.*

7I–82 551.515.2:551.579.4(52)

§Japan. Central Meteorological Observatory, Tokyo, **Taihu to Suigai.** [Typhoon and flood mage.] Tokyo, Chijin Book Co., Ltd., **1948.** 150 p. numerous figs and tables, 4 plates. **C**—This is a synoptic and climatological case study of typhoon "Kathleen," 1947, which caused ere damage on the mainland of Japan. Contents include: Ch. 1. Life history of the typhoon, . 2. Mechanism of heavy rainfall, Ch. 3. Distribution of rainfall (total daily amount of rainfall the Chichibu Weather Station on Sept. 15, 1947 reached 520 mm), Ch. 4. Floods, Ch. 5. Damage, . 6. Historical floods in Kwanto District during past years, Ch. 7. Chronological list of heavy nfall and floods and Ch. 8. Heavy rainfall in Tohoku District. *Subject Headings:* **1. Typhoon athleen" (1947) 2. Synoptic studies 3. Typhoon damage 4. Floods 5. Japan.**—*H. Arakawa.*

7I–83 551.515.2 525.63

§Leet, Lewis Don, **Causes of catastrophe; earthquakes, volcanoes, tidal waves, and hurricanes.** w York, Whittlesey House, McGraw-Hill, [**1948**]. 232 p. numerous figs., charts, photos, bles. **DLC**—A popular interpretation of geophysical theory and facts, with many schematic grams and photographs of scenes in connection with major disasters, reproductions of records, ather charts, etc. Ch. 7, **Hurricanes and typhoons** (p. 188–214), contains a discussion of many ects of hurricane formation, movement, structure, wind speeds, tides and a detailed account of

the New England hurricane of 1938, with six figures illustrating various features of the abo
Tidal waves are discussed in Ch. 6 (p. 169–187). (*Same item as* 7–45, Sept. 1950, *MAB.*) *Sub*
Headings: **1 Hurricanes 2. Tidal waves 3. Popular science books 4. New England.**—*M.R.*

7I–84 551.515.2:551.587(2

§Palmen, Erik, **On the formation and structure of tropical hurricanes.** *Geophysica*, Helsi
3:26–38, **1948.** 10 figs., 5 refs., eq. **DWB**—The author analyzed radiosonde data for the Caribb
area and found that instability of the convective or conditional type extends through much deep
thicker layers than in extratropical regions. Charts of the North Atlantic area, showing differe
between temperature of air lifted adiabatically from sea surface and that of surrounding air at
300 mb level, gives a clue to the strong tendency toward hurricane formation in the western Atla
during summer and autumn, and the inability for hurricanes to develop during winter or in the e
Atlantic. The vertical structure of hurricanes is studied and illustrated by a synoptic aerolog
analysis of the Sept. 17, 1947 hurricane. The warm core is explained dynamically. (*Same item*
7–46, Sept. 1950, *MAB.*) *Subject Headings:* **1. Hurricanes 2. Upper air climatology 3. Synop
aerological studies 4. Caribbean Sea 5. North Atlantic.**—*M.R.*

7I–85 551.515.2(2

†Riehl, Herbert, **On the formation of typhoons.** *Journal of Meteorology*, 5(6):247–264, D
1948. 28 figs., 21 refs. **DWB**—An excellent presentation of carefully analyzed upper air w
and streamline data for the western Pacific Ocean, showing that (1) there is no well defined equato
front extending across the Pacific and (2) there is a system of large scale eddies at 200 mb in
equatorial trough. Typhoons are formed as a result of instability in the trades which occurs whe
lower trough is passed over by a ridge in the high troposphere. There is no evidence of South
Hemisphere air intruding into the northwest Pacific at times of typhoon formation. Finally,
author goes into the reason for some storms developing into full-scale hurricanes. (*Same item*
2–89, Feb. 1951, *MAB.*) *Subject Headings:* **1. Typhoon formation 2. Western Pacific.**—*M.R.*

7I–86 551.51

§Riehl, Herbert (*Univ. of Chicago*), **On the formation of West Atlantic hurricanes. (Studies
upper-air conditions in low latitudes, Pt. 1.)** *Chicago Univ. Dept. of Meteorology, Miscellane
Reports*, No. 24:1–67, **1948.** 17 figs. (incl. charts), 11 tables, refs., eq. **DWB**—In order to und
stand the structure and precipitation of a hurricane, the more stable situations occurring in the W
Indies are analyzed from a climatological, aerological and synoptic point of view, and these
compared with the more unusual hurricane situations. For instance, the hurricane situati
analyzed show lower pressure up to 11 km and higher from 12–18 km, and higher temperat
(especially in upper troposphere) and humidity than the normal tropical atmosphere. No evide
of a lowered tropopause near the eye of the cyclone was found. The normal tropical disturban
however, have a cold core yet tropical cyclones develop from these normal disturbances. A m
of upper air pressure, wind and temperature data for typical situations of cyclogenesis in the W
Indies region is analyzed by means of cross-sections, adiabatic and streamline charts, and up
air synoptic charts (to 10 km). It is concluded that all tropical storms developed from equato
shear-lines and waves in the easterlies, intensified by the superposition of high-level troughs
unstable shearing waves or a combination of the two. This superposition leads to horizontal
vergence aloft, a drop in the surface pressure, but the troughs can only produce this effect at t
season when they are of great amplitude and barotropic stratification occurs on a broad scale in t
region. The various aspects of cyclogenesis due to (1) superposition and (2) due to equato
shear-lines are treated in separate chapters. Synoptic examples are given. *Subject Headin*
1. Hurricane formation 2. Hurricane theories.—*M.R.*

7I–87 551.515.21(5

Takahashi, Koichiro (*Forecasting Sec., Central Met. Obs., Tokyo*), **Typhoon in Japan.** 19
35 p. 15 figs., 13 tables, eqs., refs. throughout. **DWB**—A concise review based on some 40 pape
written by Japanese scientists. Covers seasonal variation, pressure, wind, rainfall, temperatu
humidity and cloud distribution within typhoon. Discusses the vertical structure, the "ey
of typhoon, the formation, development, energy, velocity and life of typhoon, as well as upper
currents, frontal zones, paths and various phenomena associated with typhoon (swells, high tid
pulsation of earth and atmospheric electricity). *Subject Headings:* **1. Typhoon structure 2. Revi
articles 3. Japan.**—*A.A.*

7I–88 551.515 2(72,

§U. S. Navy. Aerological Service, **Hurricanes and tropical storms of 1947, Atlantic area.** *U*
Office of Naval Operations, NAVAER 50-1R-218, March **1948.** 119 p. numerous synoptic cha
DLC—Nine hurricanes that invaded the West Indies, Gulf of Mexico or southeastern United Sta

ng 1947 are analyzed and described in detail. Full page synoptic charts are reproduced for y six hour period during the life of each storm. Track of each storm is shown individually and n composite chart for the entire season. (*Same item as* 2.9-87, Sept. 1951, *MAB.*) *Subject dings:* **1. Hurricane analysis 2. West Indies 3. Caribbean Sea.**—*M.R.*

7I–89 551.515.2(075) 551.515.2:016

U. S. Weather Bureau. **Hurricane notes.** Its *Training Paper*, No. 1, July **1948.** 210 p. 80 , 217 refs. **DWB**—A thorough review of present knowledge of hurricanes, with emphasis on the nass or synoptic aspects. Theories of origin, structure and forecasting are treated in detail. A l chronological bibliography of the best papers on tropical storms (1839–1947) is appended. ent papers are abstracted in a second (5 p.) appendix. (*Same item as* 3.2-79, Feb. 1952, *MAB.*) *iect Headings:* **1 Hurricane structure 2. Hurricane forecasting 3. Hurricane bibliographies raining manuals.**—*M.R.*

7I–90 551.515.2(267)

Vivies, P. de Martin de. **Nomenclature des cyclones ressentis à L'Ile de la Réunion (Bourbon) uis 1655.** [Catalog of cyclones experienced at Réunion Island (Bourbon) since 1655.] *La éorologie, 4th Ser.*, No. 11:229–240, July/Sept. **1948.** 13 refs. **DWB**—A catalog of over 180 ical cyclones which passed near Réunion Island from 1655–1948, including reports of damage and meteorological conditions attending many of them. Most (80%) of the storms occurred in., Feb. and March (45 in Jan., 53 in Feb., 41 in March and almost none between June and Nov.). *ne item as* 6.2-152, Feb. 1955, *MAB.*) *Subject Headings:* **1. Tropical cyclones 2. Hurricane nage 3. Long period records 4. Réunion Island.**—*M.R.*

1949

7I–91 551.515.23(265)

Hong Kong. Observatory. **Typhoon tracks, Jan./Aug., 1947–Sept./Dec. 1949.** Semiannual (sheet)—Tracks of typhoons for each half year period in the Western North Pacific are plotted; data or comments included. *Subject Headings:* **1. Typhoon tracks 2. Western North Pacific.** *C. P. Kramer.*

7I–92 551.594.7:551.515.23

Latour, Marinus H. and Bunting, Donald C., **Radar observation of Florida hurricane, Aug. 7, 1949.** *Florida. University, Engineering and Industrial Experiment Station, Engineering ress*, 3(8); *Bulletin Series* No. 29, Oct. **1949.** 11 p. 8 figs., 14 refs. **DLC**—More than 2500 r scope photographs were taken at intervals of 30 sec. from which the rate of movement of the icane was computed. (*Same item as* 2H–138, Aug. 1951, *MAB.*) *Subject Headings:* **1. Radar m detection 2. Radar echoes from hurricanes 3. Hurricane movement 4. Florida.**—*W.N.*

1950

7I–93 551.509.52

Boyce, R. E.; Ellsaesser, H. W. *et al.*, **Tropical cyclone forecasting.** Chicago Univ. Dept. of eorology, Contract N6ori-20, Task Order 23, [Unnumbered] Technical Report, June **1950.** . 14 figs., 39 refs., 3 eqs. Multilith. **DWB**—This report deals with: 1) Field experience in ntic and Pacific Oceans; 2) Recently developed forecast methods; and 3) Review of all literature ifically dealing with forecast problems. Two forecaster's work sheets are presented. Topics ed individually and appended are: 1) Summary of long wave forecasting methods; 2) Computa- of the zonal component (u) of the steering current; and 3) Specific tropical cyclone reconnaissance required by forecasting centers. *Subject Heading:* **1. Tropical cyclone forecasting.**—*W.N.*

7I–94 551.515.2(512.5)

Heywood, G. S. P., **Hong Kong typhoons.** Hong Kong, Royal Observatory, **1950.** 23 p. gs., 3 tables, 9 refs. **DWB**—Discussion of tropical cyclones in general. For those observed ong Kong from 1841–1883, 1884–1941 and 1946–49, frequency by years and months, tracks, st pressure, highest wind speeds, duration of gales, precursory signs, rainfall, weather, sea, swell, and effect of wind and rain on structures are given. Notable typhoons are mentioned. Baro- ns, anemograms, storm tracks by months, wind roses, etc. are reproduced. Table gives details l storms 1884–1949. (*Same item as* 2.5-78, May 1951, *MAB.*) *Subject Headings:* **1. Tropical nes in Hong Kong 2. Typhoons 3. Hong Kong.**—*M.R.*

7I–95 551.515.2

Japan. Central Meteorological Observatory, Tokyo, **Typhoon record of Japan,** Vol. 1–3. May 1944, Oct. 1948 and June **1950.** unpaged. Vol. 1 and 2 almost entirely charts. Vol. 3

has subtitle: **Distribution of rainfall associated with typhoons** (Pt. 1), Explanation, (Pt. 2), Cha... In Japanese. **DWB**—In Vol. 1, the monthly and annual number of typhoons affecting Japan dur... 52 years up to 1940 (570 in all) are tabulated, and their paths shown on 264 separate charts of ... East Asia-West Pacific area. In Vol. 2, 112 additional typhoons occurring from 1941–1947 ... tabulated and presented on 43 charts. In Vol. 3, the rainfall distribution over Japan during ... typhoons is shown by large isohyetal charts and inset synoptic charts with ample text and table... data to support or analyze the situations producing heavy rains. *Subject Headings:* **1. Typh... statistics 2. Typhoon atlases 3. Typhoon rainfall 4. Japan.**—*M.R.*

7I–96 551.515.21:551.5...

Mantis, Homer T., **A model of a tropical cyclone in the steady state.** *New York Univ. Col... of Engineering, Meteorological Papers,* 1(3), May **1950.** 39 p. 14 figs., 4 tables, 28 refs., 22 e... List of symbols and constants. **DWB**—Ignoring diffusion or mixing, radiation, conduction ... friction (except at the ground), and assuming steady state, Coriolis force, and circular symmet... a tropical cyclone model has been constructed which follows the hydrodynamic and thermodynam... equations for flow. The problem of the outflow aloft has been treated along the lines suggested ... Durst and Sutcliffe (1938) and extended by Sawyer (1947), Miller (1945), Koehler (19... and Haurwitz (1949). The vertical and horizontal distribution of wind, temperature, pressure a... other parameters are calculated for distances of 30 to 400 km from center and heights from surfa... up to 20 or 40,000 ft depending on the element. The model is based on the conditions which wo... exist in a mature cyclone, and checked against the actual conditions in the Florida hurricane ... Oct. 18–19, 1944. It is shown that the release of latent heat of condensation, and heat added ... frictional dissipation are both important in producing the radical temperature difference at the t... of the frictional layer. Assuming the top of the system to be 20 km, then heating by descendi... air is necessary to satisfy conditions near the surface; also oscillations in flow should exist, maki... it necessary to consider frictional influences arising from eddies near the perimeter of the cyclo... The model works very well for the lower regions near the center (30 km) but not so well for t... outer and upper portions. (*Same item as* 4.2–119, Feb. 1953, *MAB.*) *Subject Headings:* **1. Hur... cane structure 2. Cyclone models.**—*M.R.*

7I–97 551.558:551.5...

§Masuda, Y., **On the method of computing vertical motion in the atmosphere, Pt. 1–3.** *Pap... in Meteorology and Geophysics,* Tokyo, 1(1):1–28, Oct. **1950.** 15 figs., 4 refs., 58 eqs. **MH-BH...** Large scale slow vertical air motion can be computed in three ways: 1) From change of horizon... velocity with height and of potential temperature with time at a single station, using radioson... ascents twice daily and assuming adiabatic change of state. This gives vertical velocities up ... 12 cm/sec through a cold front over Tokyo. Not practicable when lapse exceeds 8°C/1000 ... 2) From change of lapse rate with height assuming geostrophic flow. This gave strong descendi... currents at 8 km in middle of a typhoon, surrounded by strong ascending currents. 3) Integrati... perturbation equations was tried but found impracticable. The third paper extends the adiaba... method to wet adiabats. This is used to give cross sections of typhoon "Kitty" which throw lig... on its structure. Nomograms are given for making the calculations. (*Same item as* 2.9–1... Sept. 1951, *MAB.*) *Subject Headings:* **1. Vertical motion 2. Mechanics of the atmosphere 3. T... phoons.**—*C.E.P.B.*

7I–98 551.515.2(26...

Miyamoto, Masaaki, **On the typhoon of the Sept. 1–14, 1940.** *Kobe, Japan. Marine Obser... tory, Memoirs,* 8:69–116, March **1950.** 24 figs., tables. **NNA**—Details of structure and charact... istics and progression of the typhoon system which generated in the vicinity of Eniwetok Isla... (159°E, 15°N) Sept. 1, 1940 are studied. Discussion of genesis, synoptic analysis and conditio... of progression are included. Several other typhoon systems, some as recent as 1949, are simila... investigated. From these analyses various conclusions are reached: two phases in the process ... progression of typhoons are seen, the continuous and the discontinuous or relay-like progressi... process; existence of the 28°N lat. front is pointed out and its importance in synoptic analysis arou... Japan; the Idu-Mariana front is defined and discussed; need for more extensive typhoon warni... system from ship's observations, etc. is stressed. *Subject Headings:* **1. Typhoon analysis 2. E... wetok Typhoon (1940) 3. Eniwetok.**—*H. P. Kramer.*

7I–99 551.515.2(52):551.50...

***§Report of the typhoon "Kitty" and "Della,"** *Japan. Central Meteorological Observatory, Tok... Memoirs.* 35(2):53–217, **1950.** figs., tables, photos. English summary p. (1)–(3). **DWB**—D... tailed case studies are presented of two typhoons which caused severe damage in Japan. Synop... conditions, including wind observations up to 40,000 ft, are discussed and precipitation distributi...

a tabulated. (*Same item as* 4.5–98, May 1953, *MAB.*) *Subject Headings:* **1. Typhoon case tories 2. Japan.**—*M. P. Kramer.*

7I–100 551.515.2

Riehl, Herbert, **A model of hurricane formation.** *Journal of Applied Physics*, 21(9):917–925, t. **1950.** 10 figs., table, 10 refs., 4 eqs. **DLC**—Thermal circulation of a mature hurricane is ussed with aid of tephigrams showing how warm, moist air is brought in at low levels and with- wn at about 200 mb (open system). Former theories of origin of hurricanes fail because they concerned mainly with low level convergence and do not supply compensating high level outflow. thor follows SAWYER in starting with high level divergence, but provides energy of maintenance n vertical circulation over a very wide area. The cyclonic vortex is situated entirely in warm (*Same item as* 2.4–83, April 1951, *MAB.*) *Subject Heading:* **1. Hurricane formation.**—*C.E.P.B.*

7I–101 551.515.2(09)(729.5)

†Salivia, Luis A., **Historia de los temporales de Puerto Rico.** [History of the tropical storms of erto Rico.] San Juan, Puerto Rico, Imprenta la Milagrosa, **1950.** Price: $3.50. 393 p. chart, les, bibliog. p. 389–393. **DWB**—A description of each of 94 tropical hurricanes which affected erto Rico from Aug. 16, 1508 to Sept. 21, 1949. Most of the material was obtained from chronicles newspaper reports, and although many years of work went into this voluminous publication; s compiled from a popular rather than a meteorological point of view. Useful features are a ing by centuries, a 5-page bibliography, and a chart of the Caribbean showing trajectories of ny tropical storms. (*Same item as* 2.8–70, Aug. 1951, *MAB.*) *Subject Headings:* **1. Hurricanes of erto Rico 2. Hurricane case histories 3. Puerto Rico.**—*M.R.*

7I–102 551.582(261:74) 551.515.2(261:74)

U. S. Coast and Geodetic Survey, **United States coast pilot, Atlantic coast, Section B, Cape Cod Sandy Hook.** 5th ed. Its *Serial*, No. 736, April 1, **1950.** 503 p. charts, diagrs., tables. In ket: **Supplement,** Jan. 1, 1951, *Serial*, No. 736-1. Price: $1.50. **DWB**—Describes forecast l warning service of U. S. Weather Bureau, marine climatological service, information services transoceanic air transport, storm signals, broadcasts by U. S. Coast Guard, reports from ships, olications, and work of many other bureaus affecting shipping. A section on **Weather and nate** (p. 44–66) contains several charts and tables showing pressure, air and water temperature Jan., April, July and Oct. along the Atlantic coast and in the Gulf of Mexico and Caribbean, a of hurricanes since 1900, and a great deal of information on winds, fog, thunderstorms, cloud and ricanes. The last subject is treated in special detail. Complete meteorological tables are ap- ded for 10 stations along the Atlantic coast. (*Same item as* 4.6–20, June 1953, *MAB.*) *Subject adings:* **1. Marine meteorology 2. Hurricane chronologies 3. Marine forecasting 4. Pilot ides 5. Atlantic Coast of United States.**—*M.R.*

7I–103 551.515.23(52)

Uwai, K., **Mechanism of heavy rainfall and front in Kwanto, Chubu and Tohoku districts nalysis of the typhoon Kathleen, Pt. 1).** *Geophysical Magazine*, Tokyo, 21(2):147–166, March **.0.** 14 figs., tables, 7 refs., 19 eqs. **DWB.** Also his: **Analysis of life history of typhoon (Analysis Kathleen typhoon, Pt. 2).** *Journal of Meteorological Research*, Tokyo, 2(6):151–163, July **1950.** gs., 6 refs., 20 eqs. In Japanese; English summary p. 41. **DWB**—In Pt. 1, the author describes course and character of the typhoon, including the generation of secondary typhoons and de- ssions. The various fronts are analyzed and the observational data are compared with theoretical suppositions involving the theory of stationary and nonstationary states. The characteristics of frontal rainfall group are discussed. A possible explanation for the propagation of progressive nfall groups in front of the warm front is proposed. In Pt. 2 the author states that the typhoon ginated in meridional oscillation of equatorial (intertropical) front due to a trough in equatorial terlies. Development is analyzed by stream lines and thermodynamically. It disappeared n the trough rose to a high level. Speed by theory of group velocity is 1–2 times speed of easter- . (Pt. 1, *same item as* 11–74, Nov. 1950; Pt. 2, 2.2–74, Feb. 1951, *MAB.*) *Subject Headings:* **Typhoon rainfall 2. Typhoon structure 3. Typhoon "Kathleen" 4. South Pacific 5. Japan.** *.L.D., C.E.P.B.*

7I–104 551.515.22(52):551.577

Uwai, K. (*Central Met. Obs., Tokyo*), **On the movement of rainfall groups, Pt. 1.** *Journal of teorological Research*, Tokyo, 2(8):217–225, July **1950.** 6 figs., 5 tables, ref. **Pt. 2, Analysis the mechanism of heavy rainfall over East Japan in the second decade of June 1950.** *Ibid.*, 4) and 2(15), p. 427–436, March **1951.** 12 figs., tables, eqs. **Pt. 3, Movement of rainfall-groups the Typhoon "Kitty."** *Ibid.*, p. 437–445. **Pt. 4, Analysis of the rainfall-groups by the Typhoons ezia" and "Jane."** *Meteorological Society of Japan, Journal*, Ser. 2, 30(8):241–254, Aug. **1952.**

10 figs., 14 refs., 6 eqs. All in Japanese; English summaries. **DWB**—In Pt. 1, isochrones of rain over N. Japan during typhoon of Sept. 16, 1948 are presented and analyzed on assumption that r areas are wave-like, frontal and nonfrontal atmospheric disturbances, and amounts will vary acco ing to combinations of waves whose travel agrees with upper air flow, the track being along the trou In Pt. 2, the mechanism of the heavy rainfall (400–600 mm), and motion of areas is explained, a the cause of heavy rainfall attributed to "the stagnation or westward motion of the trough acc panied by a warm air mass moving north from the southern ocean as a consequence of a block High to northeast and stagnation of the westerly trough." In Pt. 3 the movement (and location heaviest rainfall areas coincident with lowest temperatures) of these groups in Typhoon "Kitt (1949) and in Pt. 4 in "Kezia" and "Jane" (Sept. 1950) are investigated. Distribution of vortic is calculated by an equation developed by SYONŌ. The results are in good agreement with c clusions drawn from the distribution of rainfall groups. Curves showing the intensity of rainfall the different groups as a function of time measured from the formation of the group are also present and discussed. (Pt. 1 *same item as* 2.4–131, April 1951; Pt. 3 and 4 *same items as* 3.4–202 and 4.7– April 1952 and July 1953, *MAB.*) *Subject Headings:* **1. Typhoon rainfall 2. Typhoon case h tories 3. Japan.**—*M.R., G.T.*

1951

7I–105 551.51

Dunn, Gordon E. (*U. S. W. B., Chicago, Ill.*), **Tropical cyclones.** (In: **Compendium of m teorology.** Boston, American Meteorological Society, **1951.** p. 887–901. 9 figs., 22 refs.) **DWB** A comprehensive and very well organized survey of the origin, structure and behavior of the vario types of tropical cyclones, which are comprised of hurricanes, typhoons, cyclones, baguios and will willies. An outline of the classification of tropical cyclones according to intensity and to stage development or life history is presented and the surface characteristics such as air mass arrangeme around the cyclones, pressure gradient, oscillation of atmospheric pressure or pumping, temperatu wind circulation, cloud arrangement, precipitation distribution around cyclones, the properties of t radar bands produced by cyclones, atmospheric conditions in the "eye" of the storm and its size a duration, the frequency of thunderstorms and tornadoes and the hurricane waves and hurrica tides are discussed. The section on the vertical structure of tropical cyclones contains a br summary of theoretical views on the evacuation of air from tropical cyclones (theory of tropi cyclones is covered by H. Riehl in **Compendium,** *see* 7I-112), a discussion of the height of tropi cyclones, the thermal structures and tropopause heights in tropical cyclones, various theories on t formation of tropical cyclones, the regions and season of origin and a summary of their frequen by month. The monthly variation in the seasonal storm track, the forecasting of the direction movement such as recurvature, the role of steering currents, the forecasting significance of sto swells, storm tides and microseisms are discussed. Needed research on tropical cyclones suggest includes: collection of upper air data over oceans, further statistical and physical analysis of m teorological elements around cyclones, relationship between computed cyclostrophic term of t gradient wind and observed wind, etc. (*Same item as* 4.2–3, Feb. 1953, *MAB.*) *Subject Headin* **1. Tropical cyclones 2. Compendium articles.**—*I.L.D.*

7I–106 551.515

James, R. W., **Hurricanes.** *Science News*, London, No. 22, Nov. **1951.** 11 p. fig., 2 re **DLC**—Basic knowledge on tropical cyclones is summed up for the general reading public. Statist on the considerable decrease in losses of human life during recent years (credited to the U. S. Weath Bureau Hurricane Forecasting Service) are presented. *Subject Headings:* **1. Tropical cyclon 2. Hurricane warning services.**—*G.T.*

7I–107 551.515.23(5

*Japan. Central Meteorological Observatory, Tokyo, **Report of the typhoon "Kezia."** *Japa Central Meteorological Observatory, Tokyo, Memoirs*, 35(4):296–511;(11) (14), **1951.** figs., photo tables. In Japanese (some legends in English). English summary p. (11)–(14), following p. 5 **DWB**—A great amount of data and observations are presented in this detailed report, coveri every phase of the passage of typhoon "Kezia" over Japan in Sept. 1950. The generation, develo ment, decay and movement of the typhoon is described and its structure analyzed. Data present in tables, graphs, and charts, include surface and upper air observations and information on t distribution of rainfall, the pulsatory motion, river floods, high tide, damage, etc. The report al includes five special studies on various aspects of the typhoon, such as: Hashimoto, K.: [**Inn structure over South Kyushu**]; Uwai, K.: [**Pressure profile near its center**]; Tsutsumi, R.: [**Puls tory motion at Fukuoka**]; Ono, T.: [**Pulsatory motion at Oita**]; Yamada, S.: [**The high tides** (*Same item as* 4.2–126, Feb. 1953, *MAB.*) *Subject Headings:* **1. Typhoon data 2. Typhoon "Kezi (1950) 3. Japan.**—*G.T.*

551.509.31 551.515.2

T-1 002

Palmer, Morris L. 51 [51.5 P] Radar storm observation. In: Compendium of meteorology. American Meteorological Society. 1951. p. 1267-1283. 16 figs. bibliog. 7 refs. 4 eqs. p. 1271 (the underscanning of targets and consequent reduction in the range of hurricane and storm detection and on the forecasting of storm paths are discussed. In the storm penetrating scanning radar the operator is all [illegible] and [illegible] by radar and a [illegible] means of [illegible] is provided. The problem of locating the principal [illegible] in the radar forward wave transport and other conditions under the hurricane is considered. [illegible] abstract. MWR 79:1951. Dec. 1951. 51 A 8.) *Subject Headings:* 1. Radar storm detection 2. Radar hurricane analysis. [illegible]

551.515.2 551.55

T-1 006

Fukuoka, T. and Tsunoda, M. An aerological investigation of the structure of the typhoon [illegible] and its movement. Tokyo. 1 114 p. 24 figs. 20 refs. Dec. 1951. 20 figs. 20 refs. Over-[illegible] T. Fukuoka and M. Tsunoda. An aerological investigation of the structure of typhoon Ruth. 2nd report. Analysis of the typhoon Ruth. Journal of Meteorological Research. Tokyo. 3:441-447. Aug. 1951. 4 figs. tables. ref. In Japanese, English summary p. 441. DWB—A [illegible] meteorological study of three hurricanes from the structural point of view. Actual and [illegible] temperature, humidity and wind systems showing pressure, temperature and temperature [illegible] etc., are given for different aerological stations in Japan. It is found that a typhoon is a [illegible] cyclonic system, but is composed of several secondary circulation systems. [illegible] the [illegible] form at 4,000 m. (Jan. 1951) of 4.8 [illegible] *Subject Headings:* 1. Typhoon structure 2. Typhoon "Ruth" 1951 3. Synoptic studies 4. Japan.—*A.A.*

551.515.2 551.551.51

T-1 010

Palmer, C. E. On high-level cyclones originating in the tropics. American Geophysical Union. Transactions. 32:5. 683-690. Oct. 1951. 14 figs., 2 tables. 15 refs. DWB—Two weather situations in 1946 and March 1949 over the southern North Pacific are represented on charts at various [illegible] to the 100 mb level and compared to average and progress of various [illegible] [illegible] and some theory governing the production of the cold cores found in many [illegible] seeks a new approach to the problem. In reference to the two situations discussed, he finds cyclonic circulation originates above 30,000 ft between 15°N and 10°N where it remains station-[illegible] for very long periods before moving on to higher latitudes and converging to 600 mb or lower [illegible] on maps as a cold low. (Same item at 3.5-160. May 1952. *M.A.B.*) *Subject Headings:* 1. High [illegible] cyclones 2. Tropical cyclones 3. Cold lows 4. North Pacific.—*G.T.*

551.515 551.513.1

T-1 011

Palmer, C. E. Tropical meteorology. In: Compendium of meteorology. Boston. American Meteorological Society. 1951. p. 859-880. 4 figs. 73 refs. DWB—In connection with a comprehensive review of the 3 prevailing "schools" of tropical meteorology: 1. the climatological or statical, 2. the synoptic or Norwegian "frontal," and 3. the dynamic or perturbation, the fact is [illegible] that explanations of the genesis of hurricanes, typhoons and minor tropical disturbances, their movements, are usually expressed in terms of that particular school's approach or conceptual [illegible] advantages and weaknesses of each prominent one discussed critically, present trends and future [illegible] of rational development are outlined by each "school," and the conclusion is reached that great [illegible] progress will be achieved in the next decade because of the rich mass of data for the entire atmosphere [illegible] currently [illegible] and [illegible] from the clearing away of many [illegible] and [illegible] misconceptions by synoptic and [illegible] [illegible] through more extensive [illegible] records and theoretical [illegible] a practical [illegible] is given on a more refined [illegible] of the [illegible] and in the [illegible] of numerical [illegible] [illegible] [illegible]

10 figs., 14 refs., 6 eqs. All in Japanese; English summaries. **DWB**—In Pt. 1, isochrones of rainf over N. Japan during typhoon of Sept. 16, 1948 are presented and analyzed on assumption that ra areas are wave-like, frontal and nonfrontal atmospheric disturbances, and amounts will vary accor ing to combinations of waves whose travel agrees with upper air flow, the track being along the troug In Pt. 2, the mechanism of the heavy rainfall (400–600 mm), and motion of areas is explained, a the cause of heavy rainfall attributed to "the stagnation or westward motion of the trough accom panied by a warm air mass moving north from the southern ocean as a consequence of a blocki High to northeast and stagnation of the westerly trough." In Pt. 3 the movement (and location heaviest rainfall areas coincident with lowest temperatures) of these groups in Typhoon "Kitt (1949) and in Pt. 4 in "Kezia" and "Jane" (Sept. 1950) are investigated. Distribution of vortici is calculated by an equation developed by SYONŌ. The results are in good agreement with co clusions drawn from the distribution of rainfall groups. Curves showing the intensity of rainfall the different groups as a function of time measured from the formation of the group are also present and discussed. (Pt. 1 *same item as* 2.4–131, April 1951; Pt. 3 and 4 *same items as* 3.4–202 and 4.7–8 April 1952 and July 1953, *MAB.*) *Subject Headings:* **1. Typhoon rainfall 2. Typhoon case hi tories 3. Japan.**—*M.R., G.T.*

1951

7I–105 551.515

Dunn, Gordon E. (*U. S. W. B., Chicago, Ill.*), **Tropical cyclones.** (In: **Compendium of m teorology.** Boston, American Meteorological Society, **1951.** p. 887–901. 9 figs., 22 refs.) **DWB** A comprehensive and very well organized survey of the origin, structure and behavior of the vario types of tropical cyclones, which are comprised of hurricanes, typhoons, cyclones, baguios and will willies. An outline of the classification of tropical cyclones according to intensity and to stage development or life history is presented and the surface characteristics such as air mass arrangeme around the cyclones, pressure gradient, oscillation of atmospheric pressure or pumping, temperatur wind circulation, cloud arrangement, precipitation distribution around cyclones, the properties of t radar bands produced by cyclones, atmospheric conditions in the "eye" of the storm and its size a duration, the frequency of thunderstorms and tornadoes and the hurricane waves and hurrica tides are discussed. The section on the vertical structure of tropical cyclones contains a bri summary of theoretical views on the evacuation of air from tropical cyclones (theory of tropic cyclones is covered by H. Riehl in **Compendium,** *see* 7I–112), a discussion of the height of tropic cyclones, the thermal structures and tropopause heights in tropical cyclones, various theories on t formation of tropical cyclones, the regions and season of origin and a summary of their frequen by month. The monthly variation in the seasonal storm track, the forecasting of the direction movement such as recurvature, the role of steering currents, the forecasting significance of stor swells, storm tides and microseisms are discussed. Needed research on tropical cyclones suggest includes: collection of upper air data over oceans, further statistical and physical analysis of m teorological elements around cyclones, relationship between computed cyclostrophic term of t gradient wind and observed wind, etc. (*Same item as* 4.2–3, Feb. 1953, *MAB.*) *Subject Heading* **1. Tropical cyclones 2. Compendium articles.**—*I.L.D.*

7I–106 551.515

James, R. W., **Hurricanes.** *Science News,* London, No. 22, Nov. **1951.** 11 p. fig., 2 ref **DLC**—Basic knowledge on tropical cyclones is summed up for the general reading public. Statisti on the considerable decrease in losses of human life during recent years (credited to the U. S. Weath Bureau Hurricane Forecasting Service) are presented. *Subject Headings:* **1. Tropical cyclon 2. Hurricane warning services.**—*G.T.*

7I–107 551.515.23(5

*Japan. Central Meteorological Observatory, Tokyo, **Report of the typhoon "Kezia."** *Japa Central Meteorological Observatory, Tokyo, Memoirs,* 35(4):296–511;(11)–(14), **1951.** figs., photo tables. In Japanese (some legends in English). English summary p. (11)–(14), following p. 51 **DWB**—A great amount of data and observations are presented in this detailed report, coverin every phase of the passage of typhoon "Kezia" over Japan in Sept. 1950. The generation, develop ment, decay and movement of the typhoon is described and its structure analyzed. Data presente in tables, graphs, and charts, include surface and upper air observations and information on t distribution of rainfall, the pulsatory motion, river floods, high tide, damage, etc. The report al includes five special studies on various aspects of the typhoon, such as: Hashimoto, K.: [**Inn structure over South Kyushu**]; Uwai, K.: [**Pressure profile near its center**]; Tsutsumi, R.: [**Puls tory motion at Fukuoka**]; Ono, T.: [**Pulsatory motion at Oita**]; Yamada, S.: [**The high tides** (*Same item as* 4.2–126, Feb. 1953, *MAB.*) *Subject Headings:* **1. Typhoon data 2. Typhoon "Kezi (1950) 3. Japan.**—*G.T.*

7I–108 551.501.81:551.515.2

Ligda, Myron G. H. (*M.I.T.*), **Radar storm observation.** (In: **Compendium of meteorology.** Boston, American Meteorological Society, **1951.** p. 1265–1282. 16 figs., table, 71 refs., 4 eqs.) **DWB**—On p. 1275 the applications of air-borne and land-based radar to the study of hurricane and typhoon structure and to the forecasting of storm paths are discussed. A ppi-scope photograph showing spiral rain bands (as observed in all hurricanes and typhoons investigated by radar) and a clearly marked center of rotation is presented. The problem of correlating the precipitation pattern seen on the radar screen with pressure and other conditions within the hurricane is considered. (For fuller abstract, *see* 3.10–10, Oct. 1952, *MAB.*) *Subject Headings:* **1. Radar storm detection 2. Radar hurricane analysis.**—*G.T.*

7I–109 551.515.21(52)

§Masuda, Y. and Takeuchi, M., **An aerological investigation of the structure of the typhoon.** *Papers in Meteorology and Geophysics*, Tokyo, 2(3/4):234–262, Dec. **1951.** 25 figs., 20 refs. Also: Masuda, Y.; Takeuchi, M. and Hashimoto, M., **An aerological investigation of the structure of typhoon (2nd report)—Analysis of the typhoon Ruth.** *Journal of Meteorological Research*, Tokyo, 7):581–586, Aug. **1953.** 7 figs., table, ref. In Japanese; English summary p. 581. **DWB**—A comprehensive synoptic study of three typhoons from the dynamical point of view. Actual and potential temperature isopleths and cross sections showing pressure, temperature and tropopause conditions, etc., are given for different aerological stations in Japan. It is found that a typhoon is not a simple convective system, but is composed of several secondary convective dynamical systems. (Pt. I *same item as* 4.7–81, July 1953, *MAB.*) *Subject Headings:* **1. Typhoon structure 2. Typhoon "Ruth" (1951) 3. Synoptic studies 4. Japan.**—*A.A.*

7I–110 551.515.2(265/266)

§Palmer, C. E., **On high-level cyclones originating in the tropics.** *American Geophysical Union, Transactions*, 32(5):683–696, Oct. **1951.** 14 figs., 2 tables, 15 refs. **DWB**—Two weather situations (June 1946 and March 1949) over the southern North Pacific are represented on charts at various altitudes up to the 300 mb level and analyzed as to origin and progress of cyclonic development. The author warns about generalizing the application of his own interpretation of cyclonic development and seeks a new approach to the problem. In reference to the two situations discussed, he finds that cyclonic circulation originates above 30,000 ft between 15°N and 10°N where it remains stationary for very long periods before moving on to higher latitudes and appearing on 500 mb or lower contour maps as a cold low. (*Same item as* 3.5–160, May 1952, *MAB.*) *Subject Headings:* **1. High level cyclones 2. Tropical cyclones 3. Cold lows 4. North Pacific.**—*G.T.*

7I–111 551.585 551.513.1

†Palmer, C. E., **Tropical meteorology.** (In: **Compendium of meteorology.** Boston, American Meteorological Society, **1951.** p. 859–880. 4 figs., 73 refs.) **DWB**—In connection with a comprehensive review of the 3 prevailing "schools" of tropical meteorology: 1) the climatological or statistical, 2) the synoptic or Norwegian "frontal," and 3) the dynamic or perturbation, the fact is brought out that explanations of the genesis of hurricanes, typhoons and minor tropical disturbances, and their movements, are usually expressed in terms of that particular school's approach or concepts. The advantages and weaknesses of each approach are discussed critically, present trends and future lines of rational development are outlined for each "school" and the conclusion is reached that great progress will be achieved in the next decade because of the rich mass of data for the tropics accumulated during the war and stemming from the clearing away of many frontal and air-mass misconceptions by synopticians and, finally, through more realistic dynamic models and theory. Great emphasis is given to a more refined type of streamline analysis, and to the concept of convergence lines (not fronts) with little temperature contrast, vorticity development or cyclonic shear, and bearing little relation to "mean" conditions. (*Same item as* 3.10–12, Oct. 1952, *MAB.*) *Subject Headings:* **1. Tropical meteorology 2. Atmospheric circulation 3. Synoptic meteorology.**—*M.R.*

7I–112 551.515.2:551.513.1

†Riehl, Herbert (*Univ. of Chicago*), **Aerology of tropical storms.** (In: **Compendium of meteorology.** Boston, American Meteorological Society, **1951.** p. 902–913. 6 figs., 44 refs.) **DWB**—A comprehensive review of the current knowledge on the structure, formation and movement of tropical storms is presented. For improving observational data the author suggests observations of cumulus clouds, estimates of altitude and motion of middle and high clouds and installation of nephoscopes, and use of rawin instead of pilot balloons. With respect to methods of analysis the author proposes the extension of tropical analysis to high levels and high latitudes; the use of contour and streamline analysis and the preparation of stability charts and of charts showing the base of the westerlies. The discussion of the structure of tropical storms during the motive stage includes the following topics: the thermal structure of the rain area; the microstructure of the rain areas in particular,

pressure fluctuations and cloud conditions; the thermal structure of the eye; the dynamical struct of the storm involving heat transfer, wind distribution near the surface and upper outflow; dynamical characteristics of the eye; and the maintenance of tropical storms. The various theor of hurricane formation, namely: the convection and frontal theories and the hypotheses of J. Sawyer and of H. Riehl are presented. The role of the steering principle on the movement tropical storms, the forecasting of recurvature and of the motion of large storms are consider (*Same item as* 4.2–13, Feb. 1953, *MAB.*) *Subject Headings:* **1. Cyclonic storms 2. Atmosphe circulation 3. Tropical meteorology 4. Compendium articles.**—*I.L.D.*

7I–113 551.515.23 (2

Starbuck, L., **Statistical survey of typhoons and tropical depressions in the Western Pac and China Sea area from observations and tracks recorded at the Royal Observatory, Hong Ko from 1884 to 1947.** *Hong Kong. Royal Observatory, R.O. Technical Memoir*, No. 4, **1951.** 10 41 charts. Price: $12.00. **DWB**—A careful, statistical study of 50 years of typhoon tracks in t area bounded by lat. 5°N to 30°N and long. 105°E to 150°E and of 60 years of Hong Kong typho (winds of gale force or greater in that city). The bulk of the report consists of excellent typho charts showing monthly tracks, frequency, abnormal and typical tracks, and a characteristic pressu pattern conducive to typhoon genesis. Remarks and diagrams illustrating extent of gales, pressu precipitation and sequence of wind directions are included. (*Same item as* 3.5–164, May 19 *MAB.*) *Subject Headings:* **1. Typhoon statistics 2. Typhoon charts 3. Western Pacific 4. Chi Sea.**—*M. P. Kramer.*

7I–114 551.515.227 (266.

§Thompson, B. W., **The upper-level flow-structure near typhoons.** *Royal Meteorological Socie Quarterly Journal*, 77 (332): 272–282, April **1951.** 8 figs., 7 refs. **DLC**—Flow charts of the southwe portion of N. Pacific at 2000, 5000, 10,000 ft, preceding 19 typhoons (1947–49) show that the init small vortices tend to develop at discontinuities between easterlies to N. and westerlies to S. Th occurs in the Intertropical Convergence Zone in summer (8 cases) or in Equatorial N. Pacific Tradi discontinuity (3); but they may also form entirely within N. Pacific trades (7), although some these probably began at discontinuities; or in N. Indian westerlies (1). Analyzed 10,000 ft strea line charts are given for several cases. Divergence of N. Pacific trades to W and NW of center is constant occurrence and warning. (*Same item as* 2.6–58, June 1951, *MAB.*) *Subject Headin* **1. Typhoon genesis 2. North Pacific.**—*C.E.P.B.*

7I–115 551.515.2 (261, 72

*U. S. Air Weather Service, **Hurricanes of 1950: narrative history of each storm and commen on hurricane reconnaissance.** *U. S. Air Weather Service, Technical Report*, No. 105–77, July 195 92 p. 13 tables. Photostat. **DWB**—Illustrated analysis of 13 tropical storms in the Caribbea and N. Atlantic from Aug. 7–Oct. 29, 1950, and thorough discussion (with data) of reconnaissan activities of the Air Force and Navy during that season. *Subject Headings:* **1. Hurricane reco naissance 2. Hurricane data 3. Hurricane forecasting 4. Caribbean Region 5. North Atlanti** —*M.R.*

7I–116 551.515.2:551.509.52 (729,26

U. S. Air Weather Service, **Some aspects of hurricane forecasting.** Its *Technical Repor* 105-76, June 20, **1951.** 31 p. diagr. **DWB**—Based on experience obtained by the Air Ford Hurricane Office during 1947 through 1950, an attempt is made to formulate systematically th present knowledge of origin, intensification, movement and rules for forecasting hurricanes, especiall in the West Indies and Caribbean. Rules for determining the point of recurvature and the steerin of hurricanes are given special emphasis. Analysis and forecast procedures are also stated logically and an appendix which takes up the relation of storm waves to hurricanes in the Gulf of Mexic is included. (*Same item as* 3.7 107, July 1952, *MAB.*) *Subject Headings:* **1. Hurricane forecastin 2. Forecast aids 3. West Indies 4. Caribbean Sea 5. Gulf of Mexico.**—*M.R.*

7I–117 551.515.22:551.55 (759

U. S. Weather Bureau, **Analysis of winds over Lake Okeechobee during tropical storm of Augus 26–27, 1949.** Its *Hydrometeorological Report*, No. 26, Jan. **1951.** 80 p. 68 figs., map, table. **DW** —A detailed study of the pressure and wind field during 1949 hurricane which passed directly ove Lake Okeechobee. Individual large-scale maps are presented, showing the hourly pressure dis tribution, and the wind speed isolines for each 10 min. interval from 8 p.m.–2 a.m., and for each hou from 1 p.m. on the 26th to 9 a.m. on the 27th. Highest sustained speeds were 85 mph over the lak Lowest pressure 28.24 in. Method of determining path of storm and effect of surface friction o wind direction and wind speed fields are described. Observations were made at 7 places on Lak

echobee. (*Same item as* 2.8–68, Aug. 1951, *M.A.B.*) *Subject Headings:* **1. Wind field in hurri-es 2. Lake Okeechobee, Fla.**—*M.R.*

7I–118 551.515.21

Wobus, Hermann B., **Some aspects of surface and low level flow in an established hurricane.** folk, Va., U. S. Bureau of Aeronautics Project AROWA, Dec. 16, **1951.** 34 p. graphs, charts. **B**—Notes and charts presented at a seminar held on Nov. 16, 1951 and conducted by WOBUS he U. S. Weather Bureau. An attempt was made to create a more realistic model of surface and vorticity effects in the vicinity of a hurricane than was possible by using the Rankine ations where a sudden change from no circulation (in the outer part) to maximum circulation the inner part) took place. Velocity profiles for various radii and various types of circulation shown and compared with calculations made from the Rankine equations. Variation of wind n one quadrant to another as shown by streamlines embedded in general flow pattern are also resented. Anticyclonic vorticity at the entrance zone, and cyclonic vorticity within the storm duce various forms of flow and accelerations when air intrudes across the isobars under different ditions of pressure gradient, etc. Dynamic spirals are thus explained, and it is suggested that dynamic stability of the entrance ridge could be tested by trajectory observations of a succession ow level balloons released upstream from this ridge. Two types of flow are shown in a model— stable and unstable. (*Same item as* 4.2–121, Feb. 1953, *M.A.B.*) *Subject Headings:* **1. Hurricane amics 2. Vorticity 3. Streamlines 4. Dynamic spirals. I. U. S. Bureau of Aeronautics, ject AROWA II. Project TED UNL-MA-501 III. Kotsch, W. J.** (*ed.*).—*M.R.*

1952

7I–119 551.515.22:551.542

Fujita, T. (*Kyushu Inst. of Technology, Tobata*), **Pressure distribution within typhoon.** *Geo-sical Magazine,* Tokyo, 23(4):437–451, May **1952.** 13 figs., 3 tables, 15 refs. **DWB**—The mulas of K. TAKAHASHI and of BJERKNES for representing typhoon pressure are combined into a gle expression and with the addition of a fourth constant, the radius ratio characterizing the ssure curves, this expression describes satisfactorily typhoon pressure. The function containing s constant, termed the cyclone function, can be used to describe the form of typhoon pressure in ious stages and is applicable also to continental cyclones. Tables giving values of the cyclone ction, the values of the radius ratio and of the other constants are given. Typhoon pressures e computed and compared with the observed pressures and the anomalies, the difference between se pressures, were computed for the Muroto typhoon. The characteristics of minor troughs hin typhoon "Della" of June 20, 1949 indicate that they were not followed by any cyclonic culation around the trough center. (*Same item as* 4.11–120, Nov. 1953, *M.A.B.*) *Subject Head-:* **1. Pressure distribution in typhoons.**—*I.L.D.*

7I–120 551.515.2:551.524.7:551.543

§Fujita, Tetsuya, **Studies on typhoon and convection.** *Tobata, Japan. Kyushu Institute of hnology. Meteorological Laboratory, Report,* 2(1/4), June **1952.** 206 p. 136 figs., tables, graphs, rts, 5 refs., eqs. **DWB**—A most comprehensive study on pressure and temperature distribution hin typhoons and a new theory on convection problems with numerous examples of analyses is sented. A "cyclone function," $P=P_\infty-\psi P$ is proposed for the pressure distribution P from hoon to continental cyclone in various stages. P_∞—undisturbed pressure, ΔP—depth of the lone:

$$\psi=\left[1+\left(x\,\frac{x+1}{x+a}\right)^2\right]^{-2} \qquad x=\frac{r}{r_0}$$

radius, r_0—unit radius. Detailed tables for ψ, $\frac{\partial\psi}{\partial x}$ and $\frac{\partial\psi}{\partial a}$ are given. The author claims, and ws by examples, that pressure tendency, filling and deepening, expansion and shrinking of isobars l the temperature distribution within typhoons can be studied by means of this formula. A ailed study of pressure oscillations associated with long period wind gusts is added and the phe-menon of "pressure dips" is discussed. The horizontal and vertical temperature distribution hin a typhoon is studied and attention is given to errors in reporting upper air temperatures. hort note on föhn phenomena in typhoons is given. In order to explain horizontal convergence, author proposes an equation of upward acceleration, introducing the "convection pressure," ich is the deviation of actual air pressure from the weight pressure. The results are discussed "normal vertical and overhang" fronts and for "overrunning cold air." A mechanism for typhoon l tropical storm initiation is proposed. (*Same item as* 4.3 4, March 1953, *M.A.B.*) *Subject adings:* **1. Typhoons 2. Cyclone dynamics 3. Pressure oscillations 4. Upper air temperatures Frontal theory 6. Japan.**—*A.A.*

7I–121 551.515.2:551.506.3(93

*Giovannelli, J. (*Chief Eng., Met. Serv., New Caledonia*), **Les cyclones tropicaux en Nouvell Calédonie au cours d'un siècle, 1852–1951.** [Tropical cyclones in New Caledonia in the course the century, 1852–1951.] Nouméa, Pub. by the Meteorological Service, April **1952.** 25 p. ma diagrs., bibliog. p. 26. Mimeo. **DWB**—The first part of this report contains an account of t zone of formation of tropical cyclones in the Pacific, their trajectories and velocities, diamete intensity, associated rainfall, preliminary signs indicating the appearence of a cyclone and the peri dicity and frequency of the cyclones of New Caledonia. The second part consists of a chronological arranged table of all the cyclones that have been recorded in New Caledonia during the period 185 1951 and a description of the characteristics of each cyclone. Many charts and a bibliography of t climate of New Caledonia are included. (*Same item as* 4.5–97, May 1953, *MAB.*) *Subject Headings:* **1. Tropical cyclones 2. Long period records 3. New Caledonia.**—*I.L.D.*

7I–122 551.515.23(5

*†§Japan. Central Meteorological Observatory, Tokyo, **Data of the typhoon "Ruth."** *Memoirs*, 37(1/2):1–178, **1952.** tables, charts, 64 plates, bibliog. p. 259–276. In Japanese; forewo and legends in English. **DWB**—This rich collection of data has been published as a contributi to a typhoon research project conducted by the Central Meteorological Observatory of Japan sin 1951 (the project is planned for 3 years). The report covers the period Oct. 13–16, 1951, durir which the typhoon "Ruth" occurred. It contains surface observations for 170 stations, synopt charts, aerological data for 15 stations, detailed description and illustrations of the path of t typhoon and results of dropsonde observations and of observation of sferics. A bibliography 284 items on tropical cyclones (about half in Japanese) is added. Sample recordings (128) pressure, wind, temperature and humidity are presented. (*Same item as* 4.2–124, Feb. 1953, *MAB* *Subject Headings:* **1. Typhoon "Ruth" (1951) 2. Tropical cyclone bibliographies 3. Typhoon da 4. Japan.**—*G.T.*

7I–123 551.515.22(26

§*La Seur, N. E. and Jordan, Charles L., **A typical weather situation of the typhoon season** Chicago Univ., Dept. of Meteorology, March **1952.** 24 p. 83 figs. **DWB**—A detailed general an local synoptic aerological analysis is made of the origin, structure and movement of 3 typhoon which traversed the W. Pacific between Sept. 27 and Oct. 6, 1945 with accompanying cross section streamline analysis charts of the flow field at 2000, 10,000 and 40,000 ft and sea level and 700 m contour charts for approximately 0000 G.m.t. each day. Time cross sections (sfc. to 60,000 f are presented for 19 stations (island and weather ships) located throughout the central and weste Pacific. The large format of this report enables the reader to study all of the charts for *one* day on single page with the explanatory material on general and local circulation and weather, typhoo movement, etc. on the facing page for each of the 9 days represented. The importance of th wind field in tropical analysis is emphasized. (*Same item as* 6.6–186, June 1955, *MAB.*) *Subje Headings:* **1. Tropical meteorology 2. Typhoon analysis 3. Synoptic aerological studies 4. Wes ern Pacific. I. Riehl, Herbert.**—*M.R.*

7I–124 551.515.2

Seilkopf, Heinrich, **Zur Entstehung tropischer Wirbelstürme.** [On the origin of tropica hurricanes.] *Annalen der Meteorologie*, 5(3/5):130–140, **1952.** 6 figs., 19 refs. German an English summaries p. 130. **MH-BH**—In Aug.-Oct. E winds normally blow up to 12 km ove Fernando Noronha, but before W. Indian hurricanes these change to S-SW, indicating a quasi stationary trough off S. America. From this a cyclonic high-level vortex crosses the equator witho change of rotation, becoming anticyclonic over the Antilles. Author thinks this may contribute t formation of hurricanes. Schematic world charts of cyclone tracks in summer and autumn, an quasistationary troughs at the same time in the other hemisphere (shown as extending temporaril to the equator) show a coordination supporting this theory. (*Same item as* 4.7–82, July 1953 *MAB.*) *Subject Heading:* **1. Hurricane theory.**—*C.E.P.B.*

7I–125 551.515.2(265)(856

*U. S. Air Weather Service, **Report on the post analysis of typhoons in the Western North Pacific 1950.** Its *Technical Report*, No. 105–89, March **1952.** 86 p. tables, charts, 5 refs. Photostat **DWB**—Includes illustrations, data and discussion of observations, microseisms, use of climatology in forecasting typhoons and reports on individual storms in the Western Pacific during 1950. *Subject Headings:* **1. Typhoon analysis 2. Typhoon forecasting 3. Typhoon data 4. Western North Pacific.**—*M.R.*

7I–126 551.515.2:0

World Meteorological Organization. Eastern Caribbean Hurricane Committee, **Report o second meeting, Trinidad, June 16–19, 1952.** 13+p. **DWB**—Members of the Committee fro

anada, the U. S. and various governments in the Caribbean are listed and the minutes of the eeting, recommendations and reports of working groups are presented. A summary of North tlantic hurricane and other tropical cyclone activity during 1951 prepared by the U. S. Weather ureau from shore and weather ship reports is appended. (*Same item as* 4.2–115, Feb. 1953, *MAB.*) *ubject Headings:* **1. Hurricane warning services 2. Meteorological conferences 3. Caribbean ea. I. U. S. Weather Bureau.**—*M.R.*

1953

7I–127 551.515.2:551.509.52(263.5,265)

*Chicago. University. Dept. of Meteorology, **Recent studies on tropical meteorology.** Contract N6ori-20, Task Order 23, Final Report, Pt. 2, March **1953.** 6 papers, each paper renumbered. ontents: Hughes, Lawrence A., **On the low-level wind structure of tropical storms.** 10 p. 10 gs., table, 10 refs., eqs. Jordan, Elizabeth S., **An observational study of the upper wind circulation round tropical storms.** 9 p. 8 figs., 10 refs. Jordan, Charles L., **On the low-level structure f the typhoon eye.** 9 p. 6 figs., 7 refs. Colón, José A., **Study of hurricane tracks for forecasting urposes.** 10 p. 12 figs., 5 tables, 4 refs. (*Same item as* 5.3–106, March 1954, *MAB.*) Colón, osé A., **Mean summer atmosphere of the rainy season over the western tropical Pacific Ocean.** p. table, 2 refs. Jordan, Charles L., **Comparison between observed and geostrophic winds.** p. 6 figs., 7 refs. **DWB**—In the first article, by L. A. Hughes, "A number of reconnaissance ights into large Pacific tropical cyclones are combined to obtain a generalized pattern of winds at ow level (about 1000 ft) under both stationary and nonstationary conditions. Using these winds, number of dependent computations are made including relative trajectories, divergence, vertical otion, rainfall, energy, and relative vorticity. . . ." In the second article, by Jordan, "All avail- ble rawin reports taken within the circulation of tropical storms are combined to obtain a generalized attern of the upper wind circulation. The cyclonic circulation decreases rapidly with height and y 45,000 ft the circulation is anticyclonic beyond 3° latitude from the center. The relative vorticity n the upper troposphere was found to be negative and great enough in magnitude so that zero bsolute vorticity is approached." In the third article, by JORDAN, "Mean soundings are presented or the typhoon eye and storm circulation, based principally on dropsonde data taken by reconaissance aircraft flying at the 700-millibar level. The vertical distribution of temperature and oisture shown by these soundings, and visual observations made in the eye, are used as a basis or a qualitative discussion of the pattern of vertical motion in the eye." In the fourth article, COLÓN analyzes the data on formation and motion of hurricanes in the Caribbean during 1887–1950 to show that there are marked long period variations in mean 5-year totals as well as in 1 ear total number of storms: above average 1887–95 and 1931–50, and below average from 1896–930; and that the number of seasons with <average frequency exceeds those with >average number. n Florida, Oct. is the month with greatest risk; other areas vary as shown in table. Groups of urricanes forming in same area and following in quick succession are frequent in Aug., Sept. and ct. Probability of motion along each direction at each 5° square is shown on chart. Median peed of motion and percentage frequency of storms moving along a persistent track are also shown n charts for each month as an objective aid to effectiveness of persistence forecasting. In the ifth article, COLÓN shows in tables and on a tephigram (not found in this copy) a standard cross ection of the atmosphere for June Sept. based on 1944–47 data for Kwajalein, Guam and Palau n the Central West Pacific, compared with SCHACHT's standard atmosphere of the Caribbean Swan Island, San Juan and Miami). It is shown that the Western Pacific data differ only slightly rom the Caribbean, though the former shows higher temperatures in the low levels, lower temperature t high levels, and more moisture at all levels than does the Caribbean data. In the sixth paper, y JORDAN, "A latitudinal profile of the mean geostrophic deviation is computed from surface and ow level wind data and surface pressure gradients. The resulting geostrophic deviation is discussed n terms of the equations of motion." (*Same item as* 6.7–2, July 1955, *MAB.*) *Subject Headings:* **. Tropical cyclone structure 2. Tropical cyclone forecasting 3. Hurricane statistics 4. Caribbean ea 5. Western Pacific.**—*Authors' abstracts and M.R.*

7I–128 551.515.2:550.342

Donn, William L., **Relationship between microseism period and storm position.** Columbia niv. Lamont Geological Observatory, Contract AF 19(122)-441, Technical Report on Seismology, o. 28, July **1953.** 10 p. 4 figs., ref. Also in: *Science,* 119(3080):55–57, Jan. 8, **1954.** 3 figs., tables, 2 refs. **DWB**—Microseism periods associated with fourteen hurricanes in the western North Atlantic, Caribbean Sea and Gulf of Mexico over a number of years have been plotted at the ppropriate storm positions. Records from fifteen stations were used although only a few may have ecorded a particular microseism storm. The results show a definite period "flow" over the Gulf f Mexico, with "highs" generally southeast of Bermuda, and south of the continental shelf to the outh of Newfoundland. A less prominent "high" occurs to the north of the West Indies arc. ntermediate periods exist between Bermuda and the east coast. Period seems to show a correlation

with water depth. The variation with position seems to negate any significant ocean wave relationship. *Subject Headings:* **1. Microseism storms 2. Microseism—hurricane relationships 3. North Atlantic.**—*Author's abstract.*

7I–129 551.515.21(52):551.55

*Fujita, Tetsuya, **Analysis of winds in typhoon.** *Tobata, Japan. Kyushu Institute of Technology, Meteorological Laboratory, Report,* 3(1), April **1953.** 50 p. 43 figs. **DWB**—The wind field in typhoons is investigated in order to determine the amount of divergence and relative vorticity in connection with the observed pressure changes, precipitation patterns, stream lines, etc. of actual typhoons—"Ruth" (Oct. 1951), "Akune" (Oct. 1945) and "Della" (June 1949). These typhoons are analyzed in great detail for the period when they were over southwest Japan. Surface charts, upper level charts, self-recorder traces for numerous land stations and specially constructed vorticity-convergence, tangential and radial velocity and stream line charts are included by way of illustration. (*Same item as* 5.3–158, March 1954, *MAB.*) *Subject Headings:* **1. Typhoons 2. Wind field in typhoons 3. Relative vorticity 4 Divergence in typhoons 5. Japan.**—*M.R.*

7I–130 551.515.2:551.55

Gentry, Robert C., **Wind velocities during hurricanes.** *American Society of Civil Engineers Proceedings,* v. **79,** Separate No. **218, July 1953.** 26 p. 15 refs., eqs. **DWB**—This paper aims to provide the designing engineer with information on the strength of winds and gusts in hurricanes. The discussion covers the following topics: structure of hurricanes, duration of winds within hurricanes, force, distribution of wind velocity within hurricanes, examples of high wind velocities recorded during hurricanes, gust factor and gust ratio, variation of wind velocity with height above ground and the probability of occurrence of hurricane force winds. (*Same item as* 5.3–155, March 1954, *MAB.*) *Subject Headings:* **1. Hurricanes 2. Hurricane force winds 3. Gust loads 4. Applied meteorology 5. Building construction.**—*I.L.D.*

7I–131 551.515.21

Gherzi, Ernesto (*Macao Obs.*), **Algunas observações sobre artigos recentes da altura dos ciclones tropicais. Some remarks on recent articles on the height of tropical cyclones.** *Macao. Serviço Meteorológico, Notas Cientificas,* No. 7/8:17–32, **1953.** foot-refs. In Portuguese and English. **DWB**—The author criticizes at length some recent papers on tropical storms, published by C. L. Jordan (*see* 7I–123), Elizabeth Jordan (*see* 4.2–118, Feb. 1953, *MAB*), Simpson (*see* 4.5–101, May 1953, *MAB*), Dunn (7I–105) and Riehl (*see* 7I–112), and explains in detail his views on the formation, structure and development of typhoons. *Subject Headings:* **1. Tropical cyclones 2. Typhoon structure.**—*A.A.*

7I–132 551.515.23

§James, R. P. and Thomas, C. F. (*U. S. W. B., Wash., D. C.*), **Hurricane Barbara, 1953.** *Monthly Weather Review,* 81(8):255–265, Aug. **1953.** 20 figs., table, 3 refs. **DWB**—This hurricane which moved from the Bahamas on Aug. 11, 1953 to Hatteras Aug. 13 and NNE to New England on the 14th followed almost the same track as the storm of Sept. 10–16, 1933. Both were blocked near Newfoundland and moved northward in that area. Not much damage was done, except on the North Carolina coast where 90 mph gusts were recorded. Rainfall amounts up to 9.67" (Nags Head, N. C.) were recorded. Steering and extratropical cyclogenesis are the two aspects of this storm which are treated in detail in the synoptic and upper air analysis. *Subject Headings:* (*Same item as* 6.6–187, June 1955, *MAB.*) **1. Hurricane tracks 2. Steering current 3. Hurricane "Barbara" (1953) 4. Atlantic Coast of United States.**—*M.R.*

7I–133 551.515.2:016

†Kramer, Mollie P., **Selective annotated bibliography on the climatology and marine meteorology of the Pacific.** *Meteorological Abstracts and Bibliography,* 4(9):1036–1083, Sept. **1953. DWB**—The bibliography consists of 280 items listed chronologically [1827–1954] and subsequently in alphabetical order by the authors. The indexes cover: authors, subjects and geographic places. About 40 references are pertinent to hurricanes (typhoons). *Subject Headings:* **1. Bibliography on marine meteorology 2. Typhoon bibliography 3. Pacific.**—*W.N.*

7I–134 551.515.23

Kubota, S.; Okuta, M.; Asakura, T. and Iida, M., **Distribution of vorticity and path of typhoon.** *Journal of Meteorological Research,* Tokyo, 5(7):597–604, Aug. **1953.** 8 figs. In Japanese; English summary p. 597. **DWB**—Vorticity is calculated from observed and geostrophic winds and relations between the distribution of vorticity and path of typhoon are investigated. It appears that (1) most typhoons are apt to move along points in which vorticity is ready to be supplied and (2) when vorticity flow is considered the assumption of conservation of absolute vorticity holds good as a

st approximation. *Subject Headings:* **1. Typhoon tracks 2. Vorticity computations.**—*Authors' bstract.*

7I–135 551.515.3:551.515.2

Malkin, W. and Galway, J. G. (*U. S. W. B., WBAN Analysis Center, Wash., D. C.*), **Tornadoes ssociated with hurricanes. As illustrated by Franconia, Va., tornado, Sept. 1, 1952.** *Monthly Veather Review*, 81(9):299–303, Sept. **1953.** 6 figs., tables, 17 refs. **DWB**—One of the tornadoes ssociated with hurricane "Able," 1952, occurred near Wash., D. C., and simultaneously with the pper air sounding made there. This led to a comparison between this particular tornado, along ith others of similar environment, and conditions attributed to tornadoes in general. All such ornadoes associated with hurricanes have to date been observed only in the forward semicircle r along the advancing periphery of the tropical storm. The evidence is strong in favor of time of ay having little relation to the occurrence of such tornadoes. A hypothesis is suggested wherein ne weaker or nonexistent cyclonic horizontal wind shear of the environment may contribute to the sser severity of these tornadoes. Unlike the typical tornado sounding, the limited evidence ndicates the absence of (1) a low level temperature inversion, (2) sharp moisture stratification of ry air over moist air, (3) excessive instability. (*Same item as* 5.7–91, July 1954, *MAB.*) *Subject Headings:* **1. Tornadoes associated with hurricanes 2 Hurricane "Able" (1952) 3. Tornadoes 1. Franconia, Virginia.**—*Authors' abstract.*

7I–136 551.515.2(52)

? *§Maritime Safety Agency, Tokyo, **Handbook for mariners, V. 2, Typhoon Sanriku-oki Taihu n September 1935.** Its *Publication*, No. 812, **1953.** 29+23 p. numerous charts (fold.), photos, ables. In Japanese; some legends in French. Also: Arakawa, H. and Suda, K., **Analysis of winds, ind waves, and swell over the sea to the east of Japan during the typhoon of Sept. 26, 1935.** *Monthly Weather Review*, 81:31–37, Feb. **1953.** **DWB**—A small volume giving a complete dynamical nalysis of a historic double typhoon which affected Japan on Sept. 24–26, 1935. Detailed surface eports, streamline charts, trajectories, barograph traces, synoptic charts, statistics and descriptions in Japanese) are included. (For abstract of second title, *see* 4.11–188, Nov. 1953, *MAB.*) *Subject Headings:* **1. Typhoons, Japan (Sept. 24 26, 1935) 2. Typhoon analysis 3. Japan.**—*M.R.*

7I–137 551.515.2 551.515.21(1197)

Miyamoto, M., **Typhoon system and its cellular vortices.** *Journal of Meteorological Research*, okyo, 5(9):739 746, Nov. **1953.** 5 figs., 2 refs. In Japanese; English summary p. 739. **MH-BH** —Four individual typhoons are analyzed (1918, 1944, 1949 and 1952). A common feature of these yphoons was complex cellular structure of typhoon system, and cellular vortices different from o-called secondary typhoons. The movement of cellular vortices could not always be identified ith that of the typhoon system. *Subject Headings:* **1. Typhoon structure 2. Cellular vortices . Typhoon case histories.**—*Author's abstract.*

7I–138 551.515.2(52)

Saito, H., **On the tropical storm "Karen."** *Journal of Meteorological Research*, Tokyo, 5(7):613–20, Aug. **1953.** 7 figs. In Japanese; English summary p. 613. **DWB**—A tropical storm which eached the coast of southwestern Hokkaido on Aug. 19, 1952 is analyzed as to (1) path of the center, 2) distribution of precipitation amount, (3) inclination of axis of minimum pressure up to 300 mb nd (4) vertical distribution of mixing ratio and air temperature. Despite its weakness the storm vas notable for the rare circumstance that it passed Hokkaido in its filling stage. *Subject Headings:* **. Tropical cyclone analysis 2. Typhoon "Karen" (1952) 3. Hokkaido, Japan.**—*G.T.*

7I–139 551.515.21(52)

Syōno, S. and Kasahara, A., **The physical meaning of the negative vorticity. The theory of ropical cyclones, Pt. I.** *Journal of Meteorological Research*, Tokyo, 5(7):625–647, Aug. **1953.** 29 igs., 34 refs., 24 eqs. In Japanese; English summary p. 625 626. **MH-BH**—The theory of "alter- nate annular type distribution of negative and positive vortices" is supported by this analysis of lata for typhoons "Kitty" and "Jane" (1949, 1950). The existence of regions of a negative vertical omponent of relative vorticity is deduced from surface wind data, from precipitation distribution which agrees with the theory of vortical rain) and from time changes in the pressure distributions vhen the typhoons reached land. *Subject Headings:* **1. Tropical cyclone theory 2. Typhoon "Kitty" (1949) 3 Typhoon "Jane" (1950) 4. Japan.**—*G.T.*

7I–140 551.515.2:551.509.52

Takahashi, K., **A method of the typhoon movement forecast considering the inertia term.** *Journal of Meteorological Research*, Tokyo, 5(7):587 595, Aug. **1953.** 5 figs., 2 tables, 6 refs. In apanese; English summary p. 587. **DWB**—It is suggested that the acceleration of a typhoon's

movement is determined by the Coriolis force, the resultant of pressure acting on the wall, by selectir a proper boundary in the typhoon. According to this assumption the motion of a typhoon separated into two terms: one is the drifting motion in the general current which is equal to t geostrophic wind in the pressure pattern of the field, the other the inertia motion of typhoon, whic is given by circular motion of the deviation from the general current. A graphical method is pr posed for calculating the future movement of typhoons from the initial motion and the geostroph wind of the field at 500 mb. Movements of several typhoons in 1952 were forecast by this meth with satisfactory result. *Subject Headings:* **1. Typhoon forecasting 2. Typhoon movement.**— *Author's abstract.*

7I–141 551.515.

Takeuchi, M., **The motion of tropical cyclones in a non-uniform flow field.** *Papers in Mete rology and Geophysics*, Tokyo, 3(4):252–268, March **1953.** 9 figs., 2 tables, 21 refs., 43 eqs. **DWB**— The motion of tropical cyclones in a circular or hyperbolic flow of uniform vorticity is treated the retically. The quantitative formulation of the steering principle is undertaken. The motion wi trace a trochoid in a linear flow, an epicyclic in a circular flow and a similar motion to the form two in a hyperbolic flow. The amplitude and period of oscillation depend on the wind speed of th basic current and on the size and intensity of the storm and not on the Coriolis parameter. Bot speed and direction of a tropical cyclone are considerably affected by its oscillating motion. I some cases the storm will describe a loop path as a result of the oscillation. (*Same item as* 6.6–18 June 1955, *MAB.*) *Subject Headings:* **1. Cyclone movement 2. Tropical cyclones.**—*Author abstract.*

7I–142 551.515.2 (729,263

[U. S. Navy], **Note by the Secretary to the holders of the "Agreement for collection and dis tribution of reconnaissance and other reports of hurricanes" and the "U. S. Weather Bureau–U. S Navy Agreement for hurricane warning service."** Corrigendum. April 15, **1953.** 3+3 p. diagr. Mimeo. **DWB**—A directive outlining the procedure to be followed in aircraft reconnaissance collection and distribution of reports and division of areas of responsibility of the U. S. Air Force Navy and Weather Bureau in collecting, distributing and analyzing reports on hurricanes in th West Indies, Gulf of Mexico and Atlantic Coast area. Maps show areas, centers for forecastin and distribution of reports and reconnaissance of the 3 services. *Subject Headings:* **1. Hurrican reconnaissance 2. Hurricane warning services 3. Atlantic Coast of United States 4. Wes Indies 5. Gulf of Mexico.**—*M.R.*

7I–143 551.509.52:551.515.2 (265

§*U. S. Navy. Fleet Weather Central, Guam, Marianas Islands. **Annual report of the western North Pacific typhoon season, 1952.** "Prepared by the Typhoon Post Analysis Section, Typhoon Tracking Center, U. S. Fleet Weather Central, Guam, Marianas Islands." Its *OPNAV Report* 3140.9 **(1953).** 99+23 p. 77 figs. (photostat), tables, 21 refs. Mimeo. **DWB**—A voluminou and elaborate statistical evaluation of typhoon forecast techniques, microseism and ocean wave data and aircraft reconnaissance, and of the characteristics of 21 individual typhoons in 1952 with special regard to theories of typhoon development and phenomena attending typhoons. Rules for formation, detection, movement, intensification, winds, waves and microseisms are tested. Most significant in recurvature of typhoons is a blocking of the normal eastward moving high level cyclones or waves (at 40,000 ft) by a westward moving low latitude cyclone, causing increased meridiona flow. A typhoon forecasters guide is appended. *Subject Headings:* **1. Typhoon forecasting 2. Typhoon forecasters guide 3 Microseism—typhoon relationships 4. Western North Pacific.**—*M.R.*

7I–144 551.509.58:551.515.2

Uwai, K., **Tropopause wave and typhoon, Pt. 1.** *Geophysical Magazine*, Tokyo, 23(4):309–328, May **1952.** 22 figs., 20 refs., 10 eqs. **Pt. 2,** in *Journal of Meteorological Research*, Tokyo, 5(1):1–18, March **1953.** 8 figs., 7 refs. English summary p. 1 2. Also his: **Analysis of typhoons in 1950, Pt. 2.** *Ibid.*, 4(2,3):58–71; 118–125, May 1952. 24 figs., 20 refs. English summaries p. 3–4; 8–9. **DWB**—In the first paper, the author develops a limited method for forecasting the path of a typhoon based upon the fact that the typhoon moves in a tropopause trough, enters the region of interference between two tropopause troughs, which lie in the temperate westerlies and accompany the jet stream, and then decays rapidly over Japan. The tropopause analysis is based upon aerological data for the 300 mb surface, the isopleth of temperature distribution with height above the 300 mb surface and the topographic change of isobaric surface. Pt. 2 contains further discussion of the various types of tropopause waves associated with the Intertropical Convergence Zone, and the 300 and 200 mb surfaces and the relationship between those waves and the movement of tropical cyclones. "Westward movement of the tropopause wave (300 mb level) in which typhoons move northward comes to an end when the wave length reaches the critical length given by Rossby and Haurwitz

well known formula (4.1) or (4.4)." Life cycle of a tropopause low is traced (Fig. 6) and found similar to McDONALD's four stages of a typhoon life cycle. In the third paper, position and movement of tropopause wave troughs are studied in relation to troughs on the 300 mb surface. It is thought that the existence of 300 mb troughs can be shown more distinctly by using the distribution chart of tropopause height. Examples of multiple tropopause seen in Figs 9 and 10. Velocity of motion of tropopause waves found to be considerably less than wind speeds in the troposphere or stratosphere. Typhoon movement as related to tropopause trough alignment studied for the cases of specified typhoons in 1950 and 1951. The continuation of this paper comprises the formulation of forecast rules for typhoon paths based on a study of the relation between shifts in the jet stream and the motion of typhoon centers and of the area of higher tropopause which appears in front of and moves with the typhoon. (For fuller abstract of first paper, *see item* 5.3–108, March 1954, *MAB.*) (*Same item as* 5D–217, April 1954, *MAB.*) *Subject Headings:* **1. Typhoon track forecasting 2. Tropopause waves 3. Tropopause analysis 4. Japan.**—*I.L.D., M. P. Kramer.*

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7I–145 551.515.2

†Bergeron, T., **The problem of tropical hurricanes.** *Royal Meteorological Society, Quarterly Journal,* 80(344):131–164, April **1954.** 20 figs., 55 refs. **DWB**—Author outlines his convective theory (1928) of generation of hurricanes at tropical front (defined in a footnote). Conditions are air temperature of at least 27°C, a suitable temperature lapse to provide lability energy and a pre-existing moderate cyclonic vortex. A schematic plan and section shows "eye" and concentric zones of updraft, slight rain, maximum wind and torrential rain. This is illustrated by hurricane of Sept. 18–21, 1947 (with maps of rainfall, hourly and total) and Oct. 5–8, 1941, and contrasted with thunderstorm and "pseudo-cold front" development over land. Source of rainfall is analyzed quantitatively, giving about 15.5×10^9 ton/day; observed amount somewhat less. Development from tropical low over warm sea is examined; similar intense extratropical cyclones are illustrated by examples from Baltic. Decay of a hurricane over land is interpreted as the acquisition of a cold core with an outer ring of falling pressure. (*Same item as* 5.8–2, Aug. 1954, *MAB.*) *Subject Headings:* **1. Hurricanes 2. Review articles.**—*C.E.P.B.*

7I–146 551.515.21

†Byers, Horace R. (*Dept. of Met., Chic. U.*), **The atmosphere up to 30 kilometers.** (In: Kuiper, Gerard P. (*ed.*), **The earth as a planet.** Chic., Univ. of Chic. Press, **1954.** p. 299–370. 32 figs. (incl. photos), 5 tables, bibliog. p. 367–370.) **DLC**—A systematic summary of the latest knowledge of the origin and structure of tropical cyclones is found in Pt. 5 (p. 344–357) of this review of tropospheric and stratospheric physics. The seasonal, regional, scalar, marine, thermodynamic, subtropical and structural peculiarities of tropical cyclones are enumerated, and their origin (according to Riehl) by juxtaposition of an easterly wave under a westerly wave are hypothesized. The mechanism that causes some to die out (cold core) and others to develop or intensify (warm core) is also treated. The nature of the eye and the spiral precipitation bands is effectively illustrated by means of 8 excellent radar photographs of the hurricane of Sept. 21, 1948, made at Key West, Fla. by the U. S. Navy. *Subject Headings:* **1. Hurricane theory 2. Hurricane structure 3. Hurricane radar photographs 4. Key West Hurricane (Sept. 21, 1948) 5. Key West, Fla.**—*M.R.*

7I–147 551.515.21

†Kasahara, A. (*Geoph. Institute, Tokyo Univ.*), **Supplementary notes on the formation and the schematic structure of typhoons.** *Meteorological Society of Japan, Journal,* Ser. 2, 32(2):31–32, Feb. **1954.** 14 figs., 2 tables, 31 refs., 4 eqs. **DWB**—The necessary conditions for the formation of typhoons are discussed. The author shows that the role of vertical thermal instability of the atmosphere may be the most important among many factors of formation in the light of current stability theory. The structure of typhoons and its schematic model are discussed. The author attempts to propose a schematic model of the structure of a mature typhoon which is consistent with observations by aircraft and radar photographs. The mechanism of the formation of nonuniform cloud band in typhoons is discussed. *Subject Headings:* **1. Typhoon formation 2. Typhoon structure.**—*Author's abstract.*

7I–148 551.515.2:627.52

*†Myers, Vance A., **Characteristics of United States hurricanes pertinent to levee design for Lake Okeechobee, Florida.** *U. S. Weather Bureau, Hydrometeorological Report,* No. 32, March **1954.** 106 p. 53 figs., 12 tables, 21 refs., 12 eqs. **DWB**—This report describes the development of meteorological concepts and techniques which, in combination with oceanographic techniques, can provide design values for the levees on the shores of Lake Okeechobee. The techniques for analyzing wind and pressure data in selected hurricanes, involving the determination of wind speed profiles,

wind-direction spirals and speed of movement, the reconstruction of winds and that of storms pr to water-stage recorders, and the transposition of hurricanes are described. The application these techniques and analyses to evaluating the characteristic and resultant wind fields over La Okeechobee is illustrated. The results of the analyses are represented graphically. (*Same item* 6.7–183, July 1955, *MAB.*) *Subject Headings:* **1. Levee design 2. Hurricane analysis 3. W effects on lake levels 4. Lake Okeechobee, Fla.**—*I.L.D.*

7I–149 551.515.2(9)(2

*Philippines. Weather Bureau, **Tropical cyclones of 1949, 1950, 1951, 1952, 1953.** pub. 19 **1954.** 5 pieces. charts. **DWB**—Tracks of all typhoons, history of each cyclone, maximum 24-h rainfall wherever it occurred, maximum winds over land and sea, damage to highways and bridg crops and human casualties, and forecasts issued by the Philippine Weather Forecasting Center a given for the 1949–1953 seasons, respectively, for the area from 4°–26°N and 110°–150°E (West Pacific). (*Same item as* 4.2–112, Feb. 1953, and 5B–314, Feb. 1954, *MAB.*) *Subject Headin* **1. Typhoons 2. Typhoon statistics 3. Western Pacific 4 Philippine Islands. I. Flores, Jésus II. Tecson, Jaime J. III. Del Rosario, Casimiro IV. Cariño, Isidro D. V. Hernandez, Pedro VI. Koh, Severino L.**—*M.R.*

7I–150 551.515.23:551.509.3

Sasaki, Y. and Miyakoda, K. (*both, Geoph. Inst., Tokyo Univ.*), **Numerical forecasting of t movement of cyclone.** *Meteorological Society of Japan, Journal*, Ser. 2, 32(11,12):325–335, No Dec. **1954.** 10 figs., 4 refs., 15 eqs. In English. **DWB**—From the point of view of the numeric prediction in the barotropic model, the movement of the cyclone is studied. Removing an adequa circular vortex from the weather chart of a cyclone, the interaction between the vortex and the r sidual field is studied theoretically. Furthermore, the velocity of the movement of the high minimu (the center of the cyclone) on the constant pressure chart is derived from the height change obtain by analysis, and it is also shown by a real example that this method is objective, that is, the veloci thus obtained is uniquely determined in spite of the various circular vortices eliminated. T purpose of this paper is twofold; one is to make clear the dynamical role of the barotropic model cyclones and the other is to give basic aspect to the prediction of the movement of typhoons (ne paper). *Subject Headings:* **1. Forecasting typhoon movement 2. Numerical forecasting.**—*Author abstract.*

7I–151 551.515.2(96

Simpson, Robert H., **Hurricanes.** *Scientific American*, 190(6):32–37, June **1954.** 3 figs 3 photos. **DLC**—A semi-popular article on the structure of hurricanes and the history of reco naissance flights through center of tropical cyclones. A model cross-section of a hurricane is show Radar observations are an important part of the reconnaissance. Details of a flight in which t author participated (Aug. 15, 1951 from Guam—typhoon "Marge") are recounted. (*Same item* 6.6–183, June 1956, *MAB.*) *Subject Headings:* **1. Hurricane reconnaissance 2. Cyclone mode 3. Typhoon "Marge" (1951) 4. Guam.**—*M.R.*

7I–152 551.515.2

Sugimoto, Y., **On the eye of typhoon "Nina" 1953.** *Journal of Meteorological Research*, Toky 6(1/3):1–7, March **1954.** 9 figs., table. In Japanese; English summary p. 1. **DWB**—In Aug 1953, airplane reconnaissance of typhoon "Nina" succeeded in collecting extensive data from th eye and adjacent rain area of the storm. Twelve eye soundings from the surface to about 10,000 f were made. According to the time-cross section of temperature and humidity of the eye, tem perature and humidity change roughly within the period of 48 hrs before the mature stage. I mature stage, temperature in the eye was 25°C uniformly from the surface to the 10,500 ft leve and humidity was from 13 to 30% above the layer of 6,000 ft. Comparing with the eye sounding o "Tampa" and "Marge," temperature at the 10,000 ft level is 15°C warmer than that of "Tampa" hurricane and almost equals "Marge." From these facts adiabatic descending motion of the ai mass in the eye cannot be considered in mature stage and it is supposed that air motion in the eye i restricted not only to descending motion, but also has a certain ascending one except mature stage Horizontal temperature gradient at 10,000 ft level in the storm was observed as follows in nort quadrant. 1. Rapid fall from the center toward outside, especially at the edge of eye, was nearl 17°C in mature stage. 2. This cold air mass formed a cold ring about 70 mi wide. 3. The air mas in the cold ring was saturated. *Subject Headings:* **1. Eye of typhoon 2. Typhoon "Nina" (1953)** —*Author's abstract.*

7I–153 551.515.2:551.509.31(266

*U. S. Typhoon Post Analysis Board, Andersen Air Force Base, Guam, **1951 Annual Report o the Typhoon Post Analysis Program.** *U. S. Air Weather Service, Technical Report*, 105–124, Aug

54. 77 p. charts, graphs, and tables. Also: Its **Fifth Annual Report, 1952.** 41 p. 23 figs., bles, 14 refs. Both photostat of typescript. **DWB**—These post-analyses of typhoons for each ar contain numerous statistical as well as synoptic studies of various aspects of the subject which uld be of interest to forecasters in the area. These are formation and behavior, forecast techiques, error analysis, comparison with previous years, narrative histories of individual typhoons, eration features (network and reconnaissance charts show tracks of typhoons, structure, places of rmation, upper air movements and steerings, etc). Errors in forecasting are thoroughly analyzed d statistics presented. Easterly waves are given special emphasis in studies of origin. *Subject eadings:* **1. Typhoon post-analysis 2. Easterly waves in Pacific. I U. S. Air Weather Service.** *M.R.*

7I–154 551.515.2:06 551.509.5:551.515.2

World Meteorological Organization. Regional Association IV. Eastern Caribbean Hurricane ommittee, **Report of the Third Session, March 1954.** *World Meteorological Organization, ECHC,* **1954.** each section renumbered. **DWB**—W. A. GRINSTED, chairman of committee, presided. even members (from Canada, U. S., Bermuda, France, Netherlands, Antilles, Dominican Republic d British Caribbean territories) were present. One invited expert (from Venezuela) and 15 advisers us 7 observers were present. The meeting was held March 24–26, 1954 at Kent House, Port of ain, Trinidad. Modifications in the Hurricane Warning Service; coordination of radiosonde ork, improvement of entire Caribbean network (synoptic, pibal and rawinsonde), training of servers, solar radiation network (13 stations to be established in Venezuela), radio teletype equipent and CARMET broadcasts, International Geophysical Year, ship reports, communication facilies, WMO. Technical Assistance Program and a number of other subjects were discussed. Three solutions and 22 recommendations were made and are presented. (*Same item as* 6.9–28, Sept. 955, *MAB.*) *Subject Headings:* **1. WMO. Regional Association IV 2. Eastern Caribbean Hurriane Committee 3. WMO. meetings 4. Caribbean networks 5. Hurricane warning services.** *M.R.*

1955

7I–155 551.515.2

Adler, Irving. (Robert Irving, pseud.) **Hurricanes and twisters.** Foreword by Ernest J. hristie. Illus. by Ruth Adler. N. Y., Knopf, **1955.** 143 p. diagrs., photos. **DLC**—An easily nderstood account of the world's most famous hurricanes or typhoons and storm tide disasters in istory, with simple schematic diagrams and explanations of the mechanics or thermodynamics of urricane genesis and movement, recurvature, etc. Tornados, hailstorms, tidal waves (tsunamis), illy-willies and Bay of Bengal cyclones are also mentioned or described. Modern methods of etecting, tracking, reporting and forecasting hurricanes, especially in the Caribbean and U. S., re emphasized. Deaths due to hurricanes or tropical cyclone waves have several times reached 00 to 300 thousand people. *Subject Headings:* **1. Hurricane damage 2. Hurricanes 3. Tornadoes 4. Bay of Bengal cyclones.**—*M.R.*

7I–156 551.515.21

Dean, Gordon A., **Kinematics of double vortices.** California. University at Los Angeles. nstitute of Geophysics. Oahu Research Center, Contract AF 19(604)-546, Scientific Report, No. 12, June **1955.** 4 p. 9 figs. (7 fold.), 3 refs.—A synoptic model of the early stages of double ortices (one occurring on each side of the geographic equator) is proposed. Illustrations of specific ituations that occurred during the period April 27 to May 3, 1951 (Operation Greenhouse) are resented. *Subject Headings:* **1. Tropical cyclone theory 2 Vortex dynamics.**—*Author's abstract.*

7I–157 551.501.45:551.553.8:551.515.2

Fletcher, Robert D. (*Air Weather Service, Wash., D. C.*), **Computation of maximum surface winds in hurricanes.** *American Meteorological Society, Bulletin,* 36(6):247–250, June **1955.** 3 figs., refs., 6 eqs. **DLC, DWB**—The method for estimating the strength of winds blowing around the enters of hurricanes is based upon an interpretation of a current or prognostic surface weather map, ccuracy of maximum wind estimates depending upon the storm's central and peripheral pressures. The assumption underlying this method are as follows: the normalized pressure profiles given by $P=P(R)$ of all hurricanes are the same (P=normalized pressure and R=normalized distance); he angle of the winds with the surface is a function of R only, and this function being constant rom storm to storm, "the sea-level air density variations from storm to storm are insignificant," and "the cyclostrophic component of the wind is the only important one at the radius where the winds are strongest." The formula developed is $V_m=16\sqrt{p_a-p_o}$, where V_m is maximum wind in knots and p_a and p_o are pressure at outer edge and storm center, respectively. The verification of the formula is outlined. *Subject Heading:* **1. Hurricane wind computation.**—*I.L.D.*

7I–158 551.515.23(S

Hannay, A. K. (*Central Met. Bureau, Melbourne*), **On the movement of tropical cyclon 1954/1955 season.** *Australian Meteorological Magazine*, Melbourne, No. 9:32–43, June **1955.** figs., 4 refs. **DWB**—The tracks of all tropical cyclones in the 1954/55 season in the Australian ar were collected and studied. At the same time charts were made of the zonal discontinuity at t 200 mb level to find out what effect this had upon the tracks of the cyclones. The zonal disco tinuity is the area of separation between the broad scale westerlies and the easterlies over the equ torial and tropical regions. In all of eight cases from Jan. to March 1955, there was good relationsh between the tracks followed by the storms and the position of the zonal discontinuity. With t tropical cyclone located well to the north of the discontinuity, a component of movement from ea to west was maintained; with the cyclone located to the southward of the discontinuity, west east movement eventuated. Cases where the discontinuity moved north or south of the cyclon center resulted in slowing-down or recurvature. With one notable exception, abrupt recurvatu was not a marked feature of the season's cyclones, and this was associated with a persistence position of the 200 mb discontinuity or ridge-line. *Subject Headings:* **1. Tropical cyclone moveme 2. Zonal discontinuity 3 Recurvature of tropical cyclones 4. Australia.**—*Author's abstract.*

7I–159 551.515.21(512.31

Heywood, G. S. P. (*Royal Obs., Hong Kong*), **Some notes on the structure of Hong Kong ty phoons.** (In: UNESCO Symposium on Typhoons, Tokyo, Nov. 9–12, 1954, **Proceedings,** pu **1955.** p. 29–52. 3 refs.) **DWB**—A short spell of fine weather is almost always experienced i Hong Kong when a typhoon is approaching from the SE. It lasts until the center of the storm on the average about 300 mi away, and is attributed to divergence in the trade-wind stream whic has overtaken the typhoon on its northern side. If the dew-point in Hong Kong is several degree below normal when a typhoon is approaching, the latter is likely to lose intensity as the drie air enters its circulation. This sometimes happens in autumn when the NE monsoon has set in alon the China Coast. Rainfall observations made during the passage of typhoons indicate that th heaviest precipitation occurs some distance outside the eye of the storm. This is confirmed b radar photographs, which show a ring of very heavy rainfall whose radius is greater than that of th eye. Rainfall after the passage of the center tends to be heavier and more prolonged than durin its approach. The tropical storm of Nov. 23, 1939, is described, as it showed several unusua features. It approached Hong Kong from WSW, presumably carried along by the upper westerl airstream which prevails over S. China in winter. The great majority of typhoons affecting Hon Kong occur earlier in the season and approach from SE. This was the only occasion on record on which the eye of a tropical cyclone passed over the Observatory; observations made within the ey are briefly described. A fresh surge of the NE monsoon reached Hong Kong just after the cente had passed, and the storm became extra-tropical in type. *Subject Headings:* **1. Typhoon structur 2. Hong Kong typhoons 3. Hong Kong.**—*Author's abstract.*

7I–160 551.515.23:551.509.52

Hirasawa, K., **Forecasting of the movement of typhoon by using the steering current.** *Journa of Meteorological Research*, Tokyo, 7(1):40–54, March **1955.** 3 tables, 17 figs., 12 refs. In Japanese English abstract, p. 40. **DWB**—The author's attempt to determine the steering current which controls the movement of a typhoon with the aid of a model of the vertical structure of the typhoon in particular the vertical distribution of upper currents, and to forecast the position of the typhoon. Diagrams showing the principle for determining the steering current wind structure of specific typhoons and the behavior of the steering current are presented and the procedure for forecasting objectively the position of the typhoon is outlined. *Subject Headings:* **1. Typhoon movement forecasting 2. Steering current.**—*I.L.D.*

7I–161 551.515.21:551.506.7(51)

*Huang, Hsia-Chien (*Central Weather Bur., Taipei, Formosa*), **Typhoon structure seen from upper air data.** (In: UNESCO Symposium on Typhoons, Tokyo, Nov. 9–12, 1954, **Proceedings** pub. **1955.** p. 99–108. 6 figs., 5 refs.) **DWB**—The structure of the late season typhoon "Bess" which occurred about 300 mi east of Hong Kong on Nov. 13, 1952 is described on the basis of upper air data. Upper wind data, temperature and dew point distribution are presented graphically and charts for selected levels and a vertical cross section showing the dimensional structure of typhoon are included. The physical properties of N. Pacific trades in early Nov. are given in a table and compared with actual values over Hong Kong immediately preceding the typhoon. *Subject Headings:* **1. Typhoon structure 2. Upper air data 3. Typhoon "Bess" (1952) 4. Hong Kong** —*I.L.D.*

7I–162 551.515.23(263.4)

§Hubert, L. F., **A case study of hurricane formation.** *Journal of Meteorology*, 12(5):486–492, Oct. **1955.** 12 figs., 5 refs., eq. **DWB**—Genesis of hurricane "Alice" is examined by analyses of 24

changes of 1000, 700, 500 and 300 mb surfaces over Gulf of Mexico region for May 27–30, 1953. Vertical motion is inferred from changes of mean temperature. These showed: 1) convergence through a deep layer in lower troposphere induced a cold low; 2) convergence in a shallow layer near the surface induced ascent of surface air north of surface low; 3) isobaric surfaces were raised by the warming beneath them; 4) warm air in the upper troposphere or stratosphere and warm air in the lower troposphere became superposed. Stage 2 provides the trigger to set off hurricane formation. *Subject Headings:* **1. Hurricane formation 2. Hurricane "Alice" (1953) 3. Gulf of Mexico.**—*E.P.B.*

7I–163 551.515.2:551.461.2(75,76)

Hubert, L. F. and Clark, G. B. (*U. S. W. B., Wash., D. C.*), **The hurricane surge: an interim report.** U. S. Weather Bureau, June **1955.** 34 p. 20 figs., 12 refs., 2 eqs. **DWB**—The hurricane surge (not a true tide because it is not rhythmical) is defined and the difference between the hurricane surge and the extratropical storm surge (as covered in special bibliography *MAB*, 6(3):370–392, March 1955) pointed out as mainly due to the curved wind field and highly concentrated area of high winds. There are 3 surge producing forces: 1) set-up by wind driven water, 2) convergence of wind driven currents, 3) barometric effect—also concentration of wave energy by refraction and funneling. Seiches and shoaling are discussed from a theoretical and practical viewpoint. Histories of 16 hurricane-associated surges, (1900–1949) along the Atlantic and Gulf Coasts are reviewed and details for each shown on separate charts. *Subject Headings:* **1. Hurricane surges 2. Atlantic Coast of United States 3. Gulf Coast.**—*M.R.*

7I–164 551.515 11:551.507.362(764)

Hubert, L. F. (*U. S. W. B., Wash., D. C.*) and Berg, Otto (*Naval Research Lab., Wash., D. C.*), **Rocket portrait of a tropical storm.** *Monthly Weather Review*, Wash., D. C., 83(6):119–124, June **1955.** 5 figs. (incl. photos), 4 refs. **DWB, DLC**—Photographs taken on Oct. 5, 1954, from an Aerobee rocket fired from White Sands, N. Mex., are presented which show the cloud patterns of a tropical storm near Del Rio, Tex., and a secondary vortex over southwestern New Mexico. The method and purpose of obtaining these photographs are discussed. Detailed surface-pressure and 700-mb isotach and streamline analyses reveal features of the circulation missed by the usual contour analysis. This illustrates some possible shortcomings of our routine analysis and the utility of rocket photo-reconnaissance. *Subject Headings:* **1. Rocket photo-reconnaissance 2. Tropical cyclone cloud photography 3. Texas.**—*Authors' abstract.*

7I–165 551.515.23:551.513.3

Namias, Jerome (*U. S. W. B., Wash., D. C.*), **Long range factors affecting the genesis and paths of tropical cyclones.** (In: UNESCO Symposium on Typhoons, Tokyo, Nov. 9–12, **1954, Proceedings,** pub. **1955.** 5 figs., 6 refs.) **DWB**—The relationship of preferred paths of tropical cyclones to the form of the general circulation, in particularly with respect to its centers of action, is illustrated by several examples indicating that the "locus of tropical storm paths during a given period is associated with the mean 760 mb flow pattern and its isohypses of departures from long term normal." It is suggested that if tropical cyclone families are linked to the general circulation then "the abnormality of storminess in one area of the hemisphere may be associated with that in another more remote area" and "that areas favoring the genesis of tropical storms are presented by longer period average flow patterns." The applications of these concepts to tropical storm forecasting is discussed. *Subject Headings:* **1. Tropical cyclone tracks 2. Centers of action 3. Circulation patterns.**—*I.L.D.*

7I–166 551.515.23:551.583(74)

Namias, Jerome, **Secular fluctuations in vulnerability to tropical cyclones in and off New England.** *Monthly Weather Review*, Wash., D. C., 83(8):155–162, Aug. **1955.** 11 figs., 2 tables, 9 refs. **DWB**—Paths assumed by tropical cyclones in different fall seasons are related to the form of the prevailing mid-tropospheric general circulation. It is inferred that areas of vulnerability or invulnerability to these storms seem to be prescribed by the climatologically preferred circulation pattern during a given year, and for this reason expanded research along these lines could be highly rewarding. There is some indication that since the mid-thirties general circulation patterns have made east coast areas more vulnerable than during earlier years of the century. *Subject Headings:* **1. Secular variations in hurricane tracks 2. Climatic changes 3. Circulation patterns 4. New England.**—*Author's abstract.*

7I–167 551.515.23:551.583

Namias, Jerome; Dunn, Gordon and Simpson, R. H., **Survey of the hurricane problem.** *New York Academy of Sciences, Transactions*, Ser. 2, 17(4):346 351, Feb. **1955.** 2 figs., 3 refs. **DLC**—After an introduction by R. H. Simpson giving the reason for the accelerated interest in hurricane research (3 destructive hurricanes in 1954), Namias outlines the features of planetary flow which

by the high area of relative topography, the typhoon was forced to turn its path. *Subject Headin* **1. Recurvature of typhoons 2. Typhoon tracks.**—*Author's abstract.*

7I–177 551.515.

Takeuchi, M. (*Met. Res. Inst., Tokyo*), **On the behaviour and regeneration of tropical cyclon in the middle latitudes.** (In: UNESCO Symposium on Typhoons, Tokyo, Nov. 9–12, 1954, **Proceed ings,** pub. **1955.** p. 85–98. 33 figs., 11 refs.) **DWB**—The author describes various features of t three-dimensional structure of tropical cyclones in the middle latitudes and the mechanism of th transformation into extratropical cyclones. The typhoons analyzed are "Jane" and "Kezi (Sept. 1950), "Kate" (July 1951), "Marge" (Aug. 1951), and "Ruth" (Oct. 1951). The structure tropical cyclones in middle latitudes includes an analysis of the temperature field in the midc troposphere, the frontal systems and the wind field in the middle troposphere. The relation betwe the tropical cyclone and the cold low or cold trough in the westerlies is considered. *Subject Headin* **1. Tropical cyclone structure 2. Tropical cyclone regeneration.**—*I.L.D.*

7I–178 551.515.

Terada, K. (*Nagasaki, Japan,Marine Obs.*), **Development of typhoon from viewpoint of ener supply from ocean.** (In: UNESCO Symposium on Typhoons, Tokyo, Nov. 9–12, 1954, **Proceeding** pub. **1955.** p. 199–206.) **DWB**—The author assumes that the typhoon is circular, moves wes bound in the equatorial oceanic region and obtains water vapor from the ocean surface. The a current containing the water vapor moves into the center, acquires a vertical component and late heat is released on condensation, acts as a source of kinetic energy. The trajectories at vario points in the area of the typhoon are analyzed in terms of this supply of energy. Stationary, slo moving and fast moving typhoons are considered. *Subject Headings:* **1. Typhoon formation 2. T phoon energy source.**—*I.L.D.*

7I–179 551.515.2 (08

†UNESCO Symposium on Typhoons, Tokyo, Nov. 9–12, 1954, **Proceedings.** Pub. by th Japanese National Commission for UNESCO with the cooperation of the organizing committe for the UNESCO Symposium on Typhoons, **1955.** 257 p. figs., photos., tables, refs., eqs. **DWB**— The project for a regional symposium on typhoons was organized by UNESCO Science Cooperatio Office for Southeast Asia in Shanghai in 1951 and furthered by the Manila Branch in 1954. Th symposium, held in Tokyo on Nov. 9 to 12, 1954, was attended by 45 delegates and others, includin experts on typhoons and hurricanes from all over the world (14 countries). The publication consist of 5 papers on prevention of disaster by typhoons, 9 papers on typhoon structure, 7 papers on forma tion and development and 7 on movement of typhoons (a total of 28 papers) together with a list c participants by countries (Burma, China, India, Pakistan, Japan, Indonesia, Korea, Macao, Hon Kong, U.S.A., Vietnam, Thailand, Philippines and Ryukyu), the program, resolutions regarding WMO information bureau on coordination of world-wide research on tropical cyclones sponsore by UNESCO and on a more adequate radiosonde, radar, wind and nephoscope observation network The separate papers have been abstracted individually and the contents of the volume listed i *MAB*, July 1955, p. 1058. English abstracts of 25 papers are found in the *Meteorological Society o Japan, Journal*, Ser. 2, 32(11/12):354–358, **1954.** Other reviews: Peterson, A. D., **Typhoons** *Science*, 121(3135):122–123, Jan. 28, **1955** and **"Proceedings of the UNESCO Symposium on Ty phoons" held at Tokyo from 9 to 12 November 1954.** *UNESCO, Monthly Bulletin*, Oct. **1955** p. 4 (*Same item as* 6.11–1, Nov. 1955, *MAB.*) *Subject Headings:* **1. Typhoon symposia 2. Typhoon research.**—*M.R.*

1956

7I–180 551.515.23

*†Futi, H. (*Central Met. Obs., Tokyo*), **On the oscillatory inertia motion of the atmosphere and the meandering movement of typhoon.** *Geophysical Magazine*, Tokyo, 27(1):105–168, Jan. **1956.** 50 figs., 23 tables, 36 refs., 143 eqs. **DWB, DLC**—The oscillatory inertia motions and exact particle trajectories in various nonstationary pressure fields were investigated by means of exact solutions of the Navier-Stokes' equations of motion. At the same time isallobaric winds in above mentioned cases were studied. Concerning the meandering movement of typhoon, Syono's theory was extended considering the oscillatory inertia motion due to the development of geostrophic winds in the general pressure fields. The period (T) and the amplitude (A) of the meandering movement are given as follows, T(h) $=12/\sin\varphi$, A(km) $=0.0875\ T-V\S$ (km/h), or $A=1.05\ V\S/\sin\varphi$, where φ is the latitude of the center of typhoon and $V\S$ its velocity. These relations give satisfactory agreements excluding the parts of interactions affected by other disturbances, which are explained by the effect of another cyclone or anticyclone. *Subject Headings:* **1. Typhoon movement 2. Typhoon velocities** —*Author's abstract.*

7I–181 551.515.2:551.577(75)

Gilbert, Sterling C. and LaSeur, N. E., **Study of the rainfall pattern and some related features a dissipating hurricane.** Florida. State Univ. Dept. of Meteorology, Contract AF 19(604)-753, ientific Report, No. 2, Aug. 1, **1956.** 21 p. 11 figs., table, 2 refs.—A detailed investigation of the ourly rainfall patterns accompanying a dissipating hurricane ("Florence," Sept. 23–27, 1953) over e southeastern United States demonstrates the pronounced asymmetry in the decay of release of tent heat, the primary energy source of the storm. This is associated with the incorporation into e storm circulation of dry air in the layer 800–400 mb. This air is first drawn in from the outer ortions of the left-front quadrant, then sweeps rapidly around the storm into the right-rear and ght-front quadrant. *Subject Headings:* **1. Hurricane rainfall 2. Hurricane "Florence" (Sept. 1953) Southeastern United States.**—*Authors' abstract.*

7I–182 551.46(05)

***§Journal of Oceanography,** Kobe, Japan, Vol. 1–13, 1929–1942; Ser. 2, Vol. 1, No. 1, Oct. 1950. atest issue seen Vol. 7, No. 4/5, June **1956.** Monthly (irregular). Issued by Marine Observatory, obe. In Japanese; English titles. tables, figs. **DWB, DLC**—This Journal is, to a large part, evoted to marine meteorology. In addition to recurrent synoptic studies like "Meteorological onditions in the North Pacific and in other oceans," "Summary of the meteorological conditions in e neighborhood of Japan," etc., it contains ships' weather reports, tidal records and other coastal bservations and accounts of various weather phenomena. The available issues of the second ries (Oct. 1950-Jan. 1956) contain the following material on tropical cyclones: Meteorological ports by ships which encountered typhoons, Vol. 2, (No. 10 and 12), Vol. 3 (No. 4), Vol. 4 (12), ol. 5 (4, 5, 7 and 12) and Vol. 6 (5) (this last paper is on a hurricane).—Other reports on individual phoons, Vol. 4 (5 and 9), Vol. 5 (7 and 8), Vol. 6 (5), Vol. 7 (4/5).—Summary of typhoons in 1953 Parts 1–5), Vol. 4 (7 and 9–12).—Typhoon summary for 1954 (Pts. 1–3), Vol. 5 (8–10).—Typhoons the South China Sea (Pts. 1–5), Vol. 4 (11), Vol. 5 (1, 5, 6), Vol. 7 (4/5).—Studies on wind velocity stribution in typhoons, Vol. 4 (7, 11), Vol. 5 (9).—Tides of abnormal height or destructive waves used by typhoons, Vol. 3 (8); Vol. 4 (4, 6 and 10).—On the subtropical "Kona Storms" in the orth Pacific, Vol. 5 (3), Vol. 6 (4).—On the hydrography in the Kobe port and the northern part Osaka Bay after Typhoon "Kate," Vol. 2 (10).—The relative monthly frequencies of tropical yclones, Vol. 4 (2).—Comparison of typhoons which had similar tracks with Typhoons "5415," ol. 5 (12).—On the modes of typhoon movement off Kwanto and Sanriku, Vol. 6 (7).—Occasional ata on typhoons will also be found in the monthly sections: "Remarkable weather phenomena," ist of marine disasters" and "Tracks of centers of cyclones."—Similar material on tropical cyclones ill also be found in the pre-war Series No. 1 (1929–1942).—The papers are entirely in Japanese, ith only the titles and part of the figure captions in English. (Also abstracted under 5A–225, n. 1954, *MAB.*) *Subject Headings:* **1 Oceanography periodicals 2. Typhoon reports 3. Marine eteorology 4. Japanese area. I. Kobe, Japan. Marine Observatory.**—*G.T.*

7I–183 551.515.2:912

McGregor, Angus H., **1956 Hurricane Map.** Miami, Fla., The Caribbean & Coastal Map Co., **956.** 1 p. **DWB**—This two-color map shows the tracks of all hurricanes 1951 through 1955. he brief text explains the birth of hurricanes and the wind system in popular style. Authentic . S. Weather Bureau data are used, but the author is not associated with the U. S. Weather Bureau. he map is intended as a visual aid to anyone interested in forecasting paths of hurricanes in the tlantic coastal areas of the U. S. *Subject Headings:* **1. Hurricane charts 2. Atlantic Coast of nited States.**—*W.N.*

7I–184 551.513.2:551.515.2:551.557

Mohri, K. (*Central Met. Obs., Tokyo*), **On the characteristic structure in the mid-tropospheric esterlies accompanied with recurved typhoons.** *Geophysical Magazine,* Tokyo, 27(2):237–247, **Iarch 1956.** 14 figs., 9 refs. **DWB, DLC**—Aerological conditions of temperature, wind and umidity fields are analyzed for several cases when typhoons approach from the south to Japan nd then change their paths northeastward over Japan and vicinity. In such cases characteristic pper fronts are observed in vertical cross sections along the meridian 140°E in the mid-troposphere the north of typhoons. Lower boundaries of upper fronts (i.e., subtropical fronts) intersect with 00 mb level approximately 600–800 km north of surface typhoon centers. It is suggested that hese characteristic thermal fields might affect typhoons to change their paths and accelerate them ter the recurvature. *Subject Headings:* **1. Recurvature of typhoons 2. Japan.**—*Author's abstract.*

7I–185 551.515.21

Pfeffer, Richard L., **Concerning the mechanics of hurricanes.** Massachusetts Institute of echnology. Dept. of Meteorology, Contract AF 19(604)-1000, Scientific Report, No. 4, May 15, **956.** 25 p. 5 figs., 2 tables, 15 refs., 4 eqs. **DWB**—This is an attempt toward classification of the

regimes of motion shown to exist under different conditions of heating and rotation. The way m motions of the atmosphere are organized to transfer angular momentum between the mature hur cane and its surroundings is tabulated and discussed. Horizontal eddies at a sufficiently la distance from the center of the hurricane are primary agencies for the transport of angular momentu A combination of vertical and horizontal-eddy convection is required to maintain the hurrica *Subject Heading:* **1. Hurricane dynamics.**—*W.N.*

7I–186 551.509

*Stommel, Henry M. (*Woods Hole Oceanog. Inst.*), **Electrical data from cable may aid hurrica prediction.** *Western Union Technical Review*, 10(1):15–18, Jan. **1956.** 3 figs., 2 refs., eqs. **DWE** Electric potential measurement (since Aug. 1952) of oceanic currents, including the surface curre in the tropical Atlantic where hurricanes breed, may provide warning of a bad hurricane seas several months in advance. The surface current loses less of its sun-absorbed heat when the trad are weak. This is a gain in the heat energy required for the growth of young hurricanes. T average flow of the Florida Current may well become an index of the suggested relation betwe the trades and expected nature of the hurricane season. *Subject Headings:* **1. Long range hurrica forecasting 2. Florida current.**—*W.N.*

7I–187 551.515.2(729.7

Tannehill, Ivan Ray (*U. S. W. B., retired*), **Hurricanes, their nature and history, particular those of the West Indies and the southern coasts of the United States.** 9th rev. ed. Princeto Princeton Univ. Press, **1956.** 308 p. 141 figs., tables, bibliog. p. 295–303. Price: $4.50. **DWB** The present edition of TANNEHILL's famous work on hurricanes (originally published in 1938 a revised in 1942, 43, 44, 45, 50, & 52) contains 6 pages of description of hurricanes from 1952 19 (with corresponding revisions in the chronological list), plus charts of tracks of West Indian hurrican for each year from 1952 through 1955 (in appendix). The basic text remains as it was in the 194 (6th) edition. The various topics covered in the separate chapters are: history, wind in hurrican storm wave, origin, tracks, rainfall, pressure, signs of approach, unusual motions, frequency, d structive effects, warnings and precautions, early hurricanes (15th–18th century), hurricanes of 19 century, of 20th century and, finally, a chronology of storms from 1494 to 1900 (from Poëy a others). The appendix is concerned with observing and forecasting by modern methods (rada microseisms, sferics, upper winds, synoptic charts, etc.). (*Same item as* 7.6–3, June 1956, *MA* for abstract of 8th ed., *see* 4.7–9, July 1953). *Subject Headings:* **1. Hurricane textbooks 2. Hurrican forecasting 3. Hurricane tracks 4. West Indies 5. Atlantic Coast of United States.**—*M.R.*

7I–188 551.515.2:061

Tropical Cyclone Conference, Brisbane, Queensland, Sept. 13–16, 1955, **Report.** (Melbourn Bureau of Meteorology), [**1956?**] 228 p. figs., tables, refs. Mimeo. **DWB**—A conference, devote mainly to problems concerning tropical cyclones in the northern Australian coastal areas, was hel at Brisbane on Sept. 13–16, 1955, and was attended by over 30 officers of the Meteorological Servic Subjects covered by the papers read and discussed were: 1) tropical cyclone structure; 2) sea, su and swell; 3) theories of movement; 4) of formation, intensification and filling; 5) case histories an their presentation; 6) forecasting in 1954/55 season; 7) radar, sferics and microseism observation and use in forecasting; 8) cyclone warning terminology; 9) organization for 1954–55 season; 10) warn ings for shipping and 11) aeronautical aspects. Fourteen papers were presented and are reproduce along with discussion, in this report. The separate papers are listed on p. 1178 in Part III of thi issue. Abstracts of these papers will be published in a later bibliography on **Tropical Cyclones** *Subject Headings:* **1. Tropical cyclone conferences 2. Australia. I. Australia. Bureau of Me teorology.**—*M.R.*

7I–189 551.515.2:551.5(05

Monthly Weather Review. U. S. Weather Bureau, Washington, D. C. Vol. 1, 1873–. Lates seen Vol. 84, No. 6, June **1956. DWB, DLC, DA, MH-BH**—Throughout its long period of publica tion this journal has constantly reported on tropical cyclones in the Atlantic and Pacific and damag caused by them. Such reports will be found in brief notes describing features of individual storms in theoretical, synoptic, and statistical studies on hurricanes; in charts of hurricane tracks, etc Often, for a sequence of years recurrent sections on tropical storms of the season were maintained by various authors, [e.g. "Typhoons in the Far East" (1927–1941), "North Atlantic (North Pacific) hurricanes and tropical disturbances of the year" (appearing intermittently under varying titles through a considerable portion of the 84-year period), etc.]. These notes and other longer papers may easily be located in the annual indexes under such headings as "hurricanes," "hurricane damage," "typhoons," and the like. For shorter items and for references to hurricanes incorporated into the more general sections on weather development it may be necessary to scan through the issues for the months during which tropical storms occur. *Subject Heading:* **1. Meteorology periodicals.**

SUPPLEMENTARY MATERIAL

1801

7I–190 551.515.2(267.4)

Capper, James, **Observations on the winds and monsoons, illustrated with a chart and accompanied with notes, geographical and meteorological.** London, C. Whittingham, **1801.** 234 p. map (fold.), tables. **DLC**—This famous book cannot claim to be the first scientific study of the monsoons or trade winds, but it is definitely the first to make a systematic analysis of numerous available reports on cyclonic storms in the Bay of Bengal and along the coast of India as well as of the manner of special winds in various parts of the earth. The author states that the tempest is the same as the hurricane or whirlwind, and that hurricanes in the Gulf of Bengal are the same as those in the West Indies. Etymology of various terms is carefully noted. Accounts of several of these cyclones from the Madras hurricane of 1746 (which destroyed Le Bourdonai's fleet just after his victory there) to that of 1779 on the Malabar Coast are included. He states that a ship is near the center of the vortex if the changes in wind are sudden and the wind violent, whereas if changes are gradual it is near the edge of the storm. His attempt at explaining the cause of hurricanes is naive, for he does not believe they ever occur at sea far from land or islands and hence assumes the land is involved in their origin. *Subject Headings:* **1. Hurricanes 2. Bay of Bengal cyclones 3. Bay of Bengal.**—*M.R.*

1892

7I–191 551.515.2

Ballou, Sidney M., **The eye of the storm, Pt. 1.** *American Meteorological Journal,* Boston, 9(2):67–84, June **1892. Pt. 2,** *Ibid.,* 9(3):121–127, July **1892.** chart, table, numerous foot-refs. At head of article: *Papers from the Physical Geography Laboratory of Harvard College,* No. 6. **DLC**—The known facts and theory regarding the nature and cause of the calm or "eye of the storm" at the center of many of the most violent tropical hurricanes (but seldom found in extra-tropical cyclones) are set forth in the form of accounts from ships' logs, reproductions of barometer traces, tabulated data from 55 cases (1687–1891) on land and sea (as to duration, shift or wind, rate of movement, diameter of eye, place, date and authority), and conclusions regarding the various attributes of the "eye." Finally, the theories of Espy, Ferrel and others are examined and the conclusion reached that there is a slight descending motion, if any, in the eye, and that it is caused by centrifugal force in the region of most violent winds just outside the eye depleting the air in the center, and to frictional drag. Not all centers are alike—they vary greatly in size, cloudiness, temperature, humidity, pressure (some have falling, some steady and some rising or plateau-like pressure tendencies in center), state of sea, etc. Cross seas of great height compared with the flattened seas in the hurricane winds, sunny skies, a rise in temperature in some instances, drop in humidity, and dead calm, are the rule. Occasionally sea birds (often mortally injured and exhausted), butterflies and whales are found in the center—an argument against there being violent upward or downward air motion in the center. The breadth is 10–20 mi and height said to be not over 5 mi. *Subject Headings:* **1. Eye of hurricane 2. Hurricane structure.**—*M.R.*

1928

7I–192 551.515.2(02)

Sarasola, Simon, **Los huracanes en las Antillas.** [Hurricanes in the Antilles.] Madrid, **1928.** 54 p. numerous figs., tables and eqs. **DWB**—Pt. I of this comprehensive text takes up: history of study and general nature of West Indian hurricanes, winds, clouds, upper air currents, circulation in hurricanes at different heights, pressure, waves and swell in and as a forerunner of hurricanes, cirrus forerunners, other precursors, regions most affected, trajectories and recurvature, communications and forecasting, typical hurricanes of August, September and October respectively, navigation in hurricanes, anomalous cyclones, causes and theories, and frequency in Antilles. Pt. II gives a summary and critique of several different methods of forecasting, starting with synoptic analysis and its limitations, the Norwegian method, Guilbert's, the author's own statistical studies, Vercelli's harmonic analysis method, periodicity, solar radiation and solar influences. In the appendix there is a study of the Oct. 20, 1926 hurricane. On p. 234–251 there is a catalog and a description of all hurricanes affecting Cuba from 1865–1926. *Subject Headings:* **1. Hurricane textbooks 2. West Indian hurricanes 3. West Indies.**—*M.R.*

1950

7I–193 551.515.21(52)

Akarawa, Hidetoshi, **Vertical structure of a mature typhoon.** *Monthly Weather Review,* Wash., D. C., 78(11):197–200, Nov. **1950.** 3 figs., 5 tables, 8 refs. Also his: **Aerological observations made**

in the typhoon Kitty by the Central Meteorological Observatory, Tokyo. *Papers in Meteorol and Geophysics*, Tokyo, 1(2/4):217–221, Dec. **1950.** 2 figs., 6 refs. **DWB.** Also his: **Fine struct of a mature typhoon.** Paper presented at 4th Research Meeting of the Meteorological Rese Institute [Tokyo], March **1950.** In Japanese. Typewritten copy (in English) available at U Air Force Geophysics Research Directorate Library, Cambridge, Mass. Original uncheck Also his: **Analysis of the typhoon Kitty by means of serial ascents.** *Japan. Central Meteorolog Observatory, Tokyo, Memoirs*, 35(3):289–294, **1950.** 3 figs., table, 8 refs., eq. In Japanese; Eng summary p. (9). **DWB**—These four papers represent four slightly varying versions of an excell study (based on good radiosonde and rawin observations) of the vertical structure of a mat typhoon ("Kitty," Aug. 27–Sept. 2, 1949). Swarm ascents of radiosondes were made on Aug. and Sept. 1 at Tokyo and Tateno Observatories, and resulting data are presented in tables and cr sections (up to 18 km) showing the temperature, vertical motion, isobaric surfaces and circulat accelerations near the core (which passed just west of Tokyo), in an up-to-that-time unique mann The diagrams show warm and descending air in the core and cold and ascending air in the sto area. These motions are considered to be of "dynamic origin other than the circulation accele tion." Also the amplitude of the pressure minimum decreases with altitude. (*Same items* respectively: 2.6–57, June 1951; 2.10–77, Oct. 1951; 5D–160, April 1954; 6.5–129, May 1955, *MA Subject Headings:* **1. Typhoon "Kitty" (1949) 2. Typhoon case histories 3. Tropopause in typhoo 4. Typhoon structure 5. Japan.**—*M.R.*

1953

7I–194 551.557:551.542.1:551.51

Arakawa, H. (*Met. Res. Inst., Tokyo*), **On the maintenance of westerlies and tropical revolvi wind systems.** *Meteorological Society of Japan, Journal*, 2nd Ser., 31(6):195–205, June **19** table, 16 refs., 30 eqs. **MH-BH**—The problem of the poleward eddy flux of angular momentum attracted the attention of many meteorologists. This paper is devoted to the transformation of t Reynolds equation of mean motion and the Reynolds energy equation for the mean motion into t orthogonal curvilinear coordinates. In the second section the theory is illustrated by applicatio to cylindrical and spherical polar coordinates. In the third section the mechanism of a conversi of the eddy kinetic energy into the kinetic energy of mean zonal flow in the inter-tropical latitudes discussed in order to illustrate the maintenance of westerlies in the middle latitudes. In the l section a conversion of the eddy kinetic energy into the kinetic energy of mean revolving motion the storm region of typhoons is suggested. (*Same item as* 5.10–165, Oct. 1954, *MAB.*) *Subj Headings:* **1. Kinetic energy of typhoons 2. Typhoon mechanics 3. Kinematic analysis.**—*Autho abstract.*

7I–195 551.515.33:551.515.

Arakawa, H. (*Met. Res. Inst., Tokyo*), **Phugoid motion of whirlwinds in the atmosphere.** *Ge fisura Pura e Applicata*, 22(3/4):171–173, April/June **1952.** 3 figs., ref., eqs. **MH-BH**—T equations of motion are set up for the movement of a symmetrical whirlwind or hurricane (mu simplified) and the integrations performed for the two cases (cyclonic and anticyclonic path). It shown graphically that the motion will be trochoidal in either case. The actual path of a capti balloon (dragging a heavy mooring stone across country at Tateno Observatory) when caught in whirlwind is illustrated and found to fit the theoretical path. It is assumed that certain typhoo follow such a path but because their deviation from the average path is small, the motion is mere oscillatory. (*Same item as* 4.4–114, April 1953, *MAB.*) *Subject Headings:* **1. Whirlwind moveme 2. Typhoon tracks 3. Phugoid theory 4. Tateno Observatory, Japan.**—*Author's abstract.*

1954

7I–196 551.5(02) 551.515

§†Riehl, Herbert (*Chicago Univ.*), **Tropical meteorology.** N. Y., McGraw-Hill, **1954.** 392 tables, numerous figs., extensive bibliog. at end of each ch. **DLC**—Although this textbook deal with many aspects of tropical meteorology having some bearing on tropical cyclones (winds, tem perature, rainfall, local and diurnal effects, convection, cloud physics and tropical rain, tropic observations and analysis, divergence, vorticity, waves in the easterlies, the general circulation an low latitude disturbances, besides tropical cyclones), Ch. 11 (p. 281–357), entitled **Tropical Storm** deals especially and thoroughly with the most recent concepts of this broad field, including para graphs on the life cycle, structure, pressure, temperature, wind, rain, the eye, state of sea, upper a structure, upper air winds, clouds, thermal structure of rain area and of the eye, energetics, fr quency, detection, theory of formation, motion, internal and external forces, recurvature, fore casting methods, etc., etc. A list of 79 recent references and a good index is provided. (*Al abstracted as* 5.8–8, Aug. 1954, *MAB.*) *Subject Headings:* **1. Tropical meteorology textbook 2. Tropical cyclones.**—*M.R.*

1956

7I–197 551.515.2(263.5,261)

Dunn, Gordon E. (*U. S. W. B. Office, Miami, Fla.*), **Areas of hurricane development.** *Monthly Weather Review*, Wash., D. C., 84(2):47–51, Feb. **1956.** 7 figs., 4 refs. **DWB, DLC**—A study of 242 hurricanes (1901–55) shows by means of charts of the Caribbean and Atlantic, the locations where tropical storms reached hurricane intensity for whole year and for separate months during the hurricane season. The chart for Aug. shows, in addition to a dot for each location with year indicated, the predominant wind direction and contrary (by means of arrows) and the predominant wind force by stippling. Of the 242 hurricanes, 40 developed in disturbances moving away from the ITC in the Panama region, whereas most of the remaining 202 developed in easterly waves. Thus most hurricanes do not develop in the "doldrums" as was believed heretofore, but in the trade wind zone. Those which do develop in the ITC region, develop slowly (up to 6 days to reach hurricane intensity) whereas intensification in easterly waves is more rapid. *Subject Headings:* **1. Hurricane development areas 2. Hurricane statistics 3. Atlantic trade wind area 4. Caribbean Sea.**—*M.R.*

7I–198 551.509.31:551.501.81:551.515.2

†Kessler, Edwin, III and Atlas, David, **Radar-synoptic analysis of Hurricane Edna, 1954.** U. S. Air Force Cambridge Research Center, Geophysical Research Papers, No. 50, July **1956.** p. numerous figs., 7 tables, 34 refs., 3 eqs. **DWB, DLC**—This is the most thorough and detailed radar analysis of a hurricane or typhoon yet attempted. The course of "Edna" and its position every 6 hrs from a position just north of the Dominican Republic on Sept. 6, 1954, crossing Cape Cod on 11th at 1830 and becoming stationary north of Labrador on Sept. 13, is shown on a chart. High quality time-lapse radar photographs, synoptic charts, graphs, etc. for 11–12 Sept. when the storm passed from Hatteras to Nova Scotia are presented to show development of special fields of rain, position of "eye," speed of weather elements at various distances from the eye, vertical structure of precipitation as shown on RHI (Range Height) scope, etc. Data from aircraft reconnaissance are appended. Among other conclusions it is noteworthy that convective precipitation is found to be initiated below the level of melting, at a distance of about 450 mi in advance of center and moving with 3,000–9,000 ft winds. Also the movement of the center was not as erratic as earlier subjective estimates had indicated. False eyes were discovered, but these are short lived. Strongest winds were found west of center about time of lowest pressure. *Subject Headings:* **1. Radar-synoptic analysis of hurricanes 2. Hurricane "Edna" (1954) 3. New England.**—*M.R.*

7I–199 551.515.2:551.509.21

§U. S. Weather Bureau, **Hurricanes: a quick reference guide to synoptic charts of hurricanes that threatened or entered the United States, 1954–1955.** U. S. Weather Bureau, June **1956.** p. 380 charts. **DWB**—Six-hourly surface and 500 mb charts of all hurricanes effecting the U. S. during 1954–55 are presented in chronological order in the form of 380 full page photographic reproductions. The maps are indexed on 44 charts of 5° squares, each chart showing the path and direction of the hurricanes which have crossed that square, plus the name, date and hour of the position of its center at a given 6-hourly observation time. Thus in a minute or less one can locate an analog to a current hurricane if such existed during the 2-year period covered by the manual. Later years (for 1946–1953 and future years) will be added as fast as possible. The charts are not clear reproductions of the work charts produced at the National Weather Analysis Center. *Subject Headings:* **1. Hurricane analog guide 2. Synoptic charts of hurricanes 3. Hurricanes, Gulf Coast (1954–55) 4. Atlantic Coast of United States.**—*M.R.*

PART III. REVIEWS OF RECENT IMPORTANT METEOROLOGICAL MATERIAL, AND METEOROLOGICAL ARTICLES APPEARING IN RECENTLY ISSUED PUBLICATIONS

Note: The references to reviews of new books or monographs and the contents of periodicals included in this section are for information only and will not be listed in the monthly indexes until abstracted. When material is furnished in advance of publication, the pagination may be omitted.

A. REVIEWS OF IMPORTANT METEOROLOGICAL MATERI

American Institute of Physics: **Temperature: its measurement and control in science and indu Vol. 2,** ed. by Hugh C. Wolfe. N. Y., Reinhold, 1955. 467 p. figs., tables, bibliogs. and Price, $12.00. Review by E. A. Lynton in *Physics Today*, N. Y., 9(7):17, July 1956.

Atmosfera zemli: sbornik [Earth's atmosphere: a symposium]. Moscow, Gosud. Izdat. Kul'tu Prosvet. Lit., 1953. 422 p. figs., tables. Price, 13 R. 70 k. Review by V. A. Dzhordi in *Meteorologiia i Gidrologiia*, Leningrad, No. 2:52–55, Feb. 1956.

Brazol, Demetrio: **Dictionary of meteorological and related terms, Pt. 1, English-Spanish; P Spanish-English.** Buenos Aires, Librería Hachette, 1955. 557 p. tables. Review J. M. Rubiato and O. M. Ashford in *World Meteorological Organization, WMO Bulletin*, 5(3): July 1956.

Brooks, C. E. P. and Carruthers, N.: **Handbook of statistical methods in meteorology.** Lon Her Majesty's Stationery Office, 1953. 412 p. 75 figs., 128 tables. Review by Józs Békeffy in *Időjárás*, Budapest, 50(2):124, March/April 1956. (*See* 4.6–2, June 1953, *MAB*.)

Burgess, Eric: **Raketen in der Ionosphärenforschung** [Frontier to space]. German trans. Walter Stanner. Garmisch-Partenkirchen, Deutsche Radar-Verlagsgesellschaft mbH., 1 Price, DM 22—. Review by G. R. Haake in *Zeitschrift für Meteorologie*, 10(5):159, May 1 (*For review of original English, see* 6.10–5, Oct. 1955, *MAB*.)

Chebotarev, A. I.: **Gidrologiia sushi** [Land hydrology]. Leningrad, Gidrometizdat, 1955. Rev by V. M. Pavlov in *Meteorologiia i Gidrologiia*, Leningrad, No. 6:78, June 1956.

Cicala, Aldo: **Meteorologia pratica e strumenti** [Practical meteorology and instruments]. Tor Levrotto & Bella, 1955. 192 p. 86 figs. Review in *Geofisica e Meteorologia*, Genoa, 4(1/2) Jan./April 1956.

Daniels, F. and Duffie, J. A. (eds.): **Solar energy research.** Madison, Wisc., Univ. of Wisco Press; London, Thames & Hudson, 1955. 290 p. 53 figs. Price, 30 sh. Review by H. H wood in *Science Progress*, London, 44(175):548–549, July 1956. Review in *Nature*, Lond 177(4521):1145, June 23, 1956. (*See* 6.11–19, Nov. 1955, *MAB*.)

Halpine, Charles G. and Taylor, H. H.: **A mariner's meteorology.** N. Y., Van Nostrand, 19 371 p. figs., tables, maps. Price, $8.00; 42 sh. Review by R. F. M. Hay and C. E. N. Fra com in *Royal Meteorological Society, Quarterly Journal*, 82(353):377–378, July 1956.

International Union of Geodesy and Geophysics. Association of Meteorology, Rome, 1956: **Scien Proceedings.** London, Butterworth's Scientific Publications, 1956. 594 p. 204 figs., plates. Price, 80 sh. Review by R. C. Sutcliffe in *Weather*, London, 11(8):265–266, Aug. 19

Kochin, N. E.; Kibel' I. A. and Roze, N. V.: **Theoretische Hydromechanik** [Theoretical hyd mechanics]. [Trans. from Russian.] Vol. 1, pub. Berlin, Akademie Verlag, 1954. Vol pub. 1955. 508 and 569 p. numerous figs., refs. Review by Józsefné Békeffy in *Időjár* Budapest, 50(2):123, March/April 1956. Review of Vol. 1 by T. V. Davies in *Royal Mete logical Society, Quarterly Journal*, 81(350):647, Oct. 1955. His review of Vol. 2, in *ibid.*, 82(35 378, July 1956.

Khromov, S. P. and Mamontova, L. I.: **Meteorologicheskiĭ slovar'** [Meteorological glossar Leningrad, Gidromet. Izdat, 1955. 455 p. figs., tables. Price, 18.9 rubles. Review G. A. Bull in *Royal Meteorological Society, Quarterly Journal*, 82(353):376, July 1956. (7.8–10, Aug. 1956, *MAB*.)

Matveev, L. T. and Smirnov, P. I.: **Osnovy aviatsionnoĭ meteorologii** [Aviation meteorolog [Leningrad], Voennoe Izdat. Ministerstva Oborony SSSR, 1955. Review by D. P. Timoĭ in *Meteorologiia i Gidrologiia*, Leningrad, No. 6:63–66, June 1956.

ray, R.: **Some features of jet-streams as shown by aircraft observations.** *Great Britain. Meteorological Office, Geophysical Memoirs*, No. 97, 1956. 26 p. 17 figs. Price 4 sh. 6 d. Review in *World Meteorological Organization, WMO Bulletin*, 5(3):121–122, July 1956. (*See* 7.6–9, June 1956, *MAB.*)

B. METEOROLOGICAL ARTICLES APPEARING IN RECENTLY ISSUED PUBLICATIONS

erican Geophysical Union, Transactions, Vol. 37, No. 4, August 1956

Moler, W. F. and Arvola, W. A.: **Vertical motion in the atmosphere and its effect on VHF radio signal strength,** p. 399–409

Chilingar, George V.: **Cl′ and SO_4'' content of atmospheric precipitation in USSR: a summary,** p. 410–412

Tanner, C. B. and Suomi, V. E.: **Lithium chloride dewcel properties and use for dew-point and vapor-pressure gradient measurements,** p. 413–420

Hiser, Homer W.: **Type distributions of precipitation at selected stations in Illinois,** p. 421–424

Tabata, Susumu and Groll, A. W.: **Effect of ship's roll on the Ekman current meter,** p. 425–428

Fishel, V. C.: **Long-term trends of ground-water levels in the United States,** p. 429–435

Rorabaugh, M. I.: **Prediction of ground-water levels on basis of rainfall and temperature,** p. 436–441

Clark, William E.: **Forecasting the dry-weather flow of Pond Creek, Oklahoma: a progress report,** p. 442–450

Merriam, Carroll F.: **Potential value of ground-water data,** p. 463–467

A.G.U. Special Committee on Cosmic-Terrestrial Relationships, **Report, June 30, 1956,** p. 411–496

Dreibelbis, F. R. and Remson, Irwin: **Discussion of "The displacement of calibration curves for electrical soil-moisture units" by Irwin Remson and G. S Fox [In Transactions, 36, p 821–826, 1955]** p. 497–499

Hopkins, Charles D., Jr.: **Discussion of "A graphical solution of the flood-routing equation of linear storage-discharge relation" by J. E. Nash and J. P. Farrell [In Transactions 36 p. 319–320, 1955]**, p. 500–501

American Geophysical Union. Committee on Cloud Physics: **[Report on] Activities, 1955. Helmut Weickmann, Chairman,** p. 523–524

Austin, Thomas S.: **Report in first Mid-Pacific Regional Meeting [of American Meteorological Society]**, p. 526

ewandte Meteorologie, Berlin, Vol. 2, No. 8, June 1956

Eschke, W.: **Über die Verwendung von Bakteriophagen zur UV-Dosimetrie,** [Application of bacteriaphages to UV dosimetry], p. 225–237

Eschke, W.: **Ein Vorschlag für ein einfaches UV-Dosimeter,** [A suggestion for a simple UV-dosimeter], p. 237–240

Koitzsch, R. and Rabsch, B.: **Über Erdbohrer zur Entnahme kleiner Volumenproben bei leichten Böden,** [A soil auger for taking small samples of light soils], p. 240–244

Band, G.: **Raumklimatische Studien zur Konvektions- und Deckenstrahlungsheizung,** [Studies of room climate for convection and radiant ceiling heating], p. 245–253

Fuss, Franz: **Über die Entwicklung von Weizen in Abhängigkeit von der Bodentemperatur,** [Dependence of the development of wheat upon temperature], p. 253–256

Vol. 2, No. 9, July 1956

Knepple, Rudolf: **Die biologischen Wirkungen der infraroten Eigenstrahlung (Gegenstrahlung) der Atmosphäre auf den Menschen Die tonischen Wirkungen des Wetters,** [The biological effects of infrared radiation (counter-radiation) of the atmosphere on man: the tonic effect of weather], p. 257–276

Picko, V.: **Die stochastische Abhängigkeit in der Bioklimatologie (Die Applikation der mathematischen Statistik in der Bioklimatologie),** [Stochastic dependence in bioclimatology: The application of mathematical statistics in bioclimatology], p. 276–281

Mrose- Helmut: **Der Einfluss des Waldes auf die Luftfeuchtigkeit,** [The influence of forests on atmospheric humidity], p. 281–286

alen der Meteorologie, Hamburg, Vol. 7, No. 3/4, 1955/1956

Geiger, Rudolf: **Das Leben von August Schmauss (26.11.1877–10.10.1954),** [The life of A. Schmauss], p. 161–172

Dessauer, F.; Graffunder, W. and Laub, J.: **Beobachtungen über Ionenschwankungen i Freien und in geschlossenen Räumen,** [Observations of ion variations in the open and closed rooms], p. 173–185

Rodewald, Martin: **Schwankungen der Sonnenfleckentätigkeit und Luftdruckschwankun im Raume Europa-Nordatlantik (1–2 Mitt.),** [Variations of the sunspot activity a atmospheric pressure variations in the Europe-North Atlantic area, Pt. 1–2], p. 186–21

Walden, Hans: **Ein neues Diagramm zur Berechnung des Seegangs aus den Windverhältniss** [A new diagram for calculating the sea disturbance from the wind conditions], p. 213–

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Schulze, Rudolf: **Medizin-meteorologische Arbeitstagung vom 17. bis 19. März 1955 in Ha burg,** [Medical-meteorological Conference March 17–19, 1955 in Hamburg], p. 1–2

Kuhnke, Wolfgang: **Meteorologische Grundlagen einer medizin-meteorologischen Vorhersa** [Meteorological bases of a medical-meteorological forecast], p. 3–20

Becker, Friedrich: **Arbeitsgrundlage der medizin-meteorologischen Vorhersage im Königstei Arbeitskreis,** [Working basis of medical-meteorological forecasting in the Königst working group], p. 21–25

Ungeheuer, Hans: **Ein meteorologischer Beitrag zu Grundproblemen der Medizin-Meteorolo** [A meteorological contribution to basic problems of medical meteorology], p. 26–29

Daubert, Karl: **Einige Beispiele meteorotroper Wettersituationen und Ergebnisse der mediz meteorologischen Vorhersagen an Hand des Tübinger Krankenmaterials,** [Some examp of meteorotropic weather situations and results of medical-meteorological forecasts on basis of clinical material from Tübingen], p. 30–36

Beleke, Hans: **Der Arzt und die medizin-meteorologische Vorhersage sowie Standpunkt Internisten,** [The doctor and the medical-meteorological forecast and the viewpoint the internist], p. 37–40

Straube, G.: **Der Standpunkt des Sanatoriumarztes zur medizin-meteorologischen Vorhersa** [The standpoint of the sanatorium doctor on medical meteorological forecasts], p. 41–4

Kümmel, Hermann: **Standpunkt des Chirurgen zur medizin-meteorologischen Vorhersag** [Standpoint of surgeons on medical-meteorological forecasts], p. 43–48

Harry, Walter: **Die Bedeutung der medizin-meteorologischen Vorhersage für den praktisch Arzt,** [The importance of the medical-meteorological forecast for the general practitione p. 49

Rickmann, Ludger: **Welchen Nutzen hat eine medizin-meteorologische Vorhersage für Behandlung im Lungensanatorium?** [Of what use are medical-meteorological forecasts treating pulmonary diseases in sanatoriums?], p. 51–53

Pichotka, Josef: **Das physiologische Experiment in der medizin-meteorologischen Forschun** [The physiological experiment in medical meteorological research], p. 54–68

Jungmann, Horst: **Die Kreislaufanalyse als Mittel zur Beobachtung von Wetter- und Klim wirkungen auf den Menschen,** [Analysis of the circulatory system as a means of observati of the effects of weather and climate on man], p. 69–74

Zink, Otto: **Die Ketosteroiduntersuchungen, eine Methode zur Abschätzung der biologisch Wetterwirksamkeit,** [Keto-steroid investigations, a method of estimating biological acti of weather], p. 75–79

Straube, G.: **Die vegetativ nervöse Reaktion bei internen Erkrankungen unter Wettereinflus** [Influence of weather upon the reaction of the vegetative nervous system in intern diseases], p. 80–82

von Ekesparre, W.: **Kapillarresistenzmessungen bei commotio cerebri im Vergleich zu Wettergeschehen,** [Measurements of capillary resistance in case of concussion in relati to weather], p. 83–85

Mücher, Hans: **Über einen experimentellen Ansatz zur Analyse wetterbedingter physiologisc psychologischer Wechselwirkung,** [Experimental analysis of physiological-psychologic interactions caused by weather], p. 86–88

Aichinger, F. and Müller, I. L.: **Das Vielfachelektrodermatogramm und seine Ahhängigke von meteorotropen Wetterlagen,** [The multiple electrodermatogram and its dependen on meteorotropic weather situations], p. 89–93

Dönhardt, Axel: **Pathologie und Klinik der Poliomyelitis,** [Pathology and clinical aspect of poliomyelitis], p. 94–102

Windorfer, Adolf: **Die Epidemiologie der Poliomyelitis,** [Epidemiology of poliomyelitis p. 103–110

Martini, Rudolf: **Poliomyelitis und Wetter,** [Poliomyelitis and weather], p. 111–117

Krey, W.: **Zur Poliomyelitis-Epidemiologie letzter Jahre in Hessen (Ergänzungsbeitrag z den Vorträgen von Windorfer and Martini),** [Epidemiology of poliomyelitis during rece years in Hesse (Supplements to the papers by Windorfer and Martini)], p. 118–121

Wildführ, Georg: **Beobachtungen zur Wetterabhängigkeit der Poliomyelitis,** [Observations on the dependence of poliomyelitis on weather], p. 121–125
Donle, Wilhelm: **Diskussionsbemerkungen zu "Poliomyelitis und Wetter,"** [Discussion comments on "Poliomyelitis and Weather"], p. 125–126
Ulrich, Karl-Otto: **Diskussionsbeitrag zu "Poliomyelitis und Wetter 1953 and 1954,"** [Contributions to the discussion on "Poliomyelitis and Weather 1953 and 1954"], p. 127–130
Cordes, H.: **Über Zusammenhänge zwischen epidemischen Krankheiten und Wetter am Beispiel der Grippe,** [On connections between epidemics and weather as illustrated by influenza], p. 131–132
Schröder, Bertold: **Unfälle und Wetter,** [Accidents and weather], p. 133–136
Köhn, Werner: **Hamburger Verkehrsunfälle und Wetter,** [Hamburg traffic accidents and weather], p. 137–147
Cyran, W.: **Betriebsunfälle und Wetter (Eigenreferat),** [Industrial accidents and weather (summary)], p. 148
Daubert, Karl: **Betriebsunfälle der Bundesbahn in Württemberg und Wettergeschehen,** [Accidents on the Wurttemberg Federal railroad and weather], p. 149–151
Spann, W.: **Diskussions-Beitrag zu "Verkehrsunfälle und Wetter,"** [Discussion of "Traffic accidents and weather"], p. 152
Reise, Hans: **Rechtliche Bedeutung von Wettereinflüssen auf Menschen,** [Judicial significance of weather influences on men], p. 153–157

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Busch, R.; Harnischmacher, E. and Rawer, K.: **Observations ionosphériques effectuées durant l'éclipse solaire du 30 juin 1954 à Fribourg,** [Ionospheric observations made during the solar eclipse of June 30, 1954 at Fribourg], p. 1–15
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